LG

RC-185

MODEL

SERVICE MANUAL

SECTION 1

SUMMARY

CONTENTS

PRODUCT SAFETY SERVICING GUIDELINES FOR VIDEO PRODUCTS 1-2
SERVICING PRECAUTIONS 1-3
THE STEPS FOR CHANGE THE OPTION CODE 1-4
UP-DATING PROGRAM 1-5
SPECIFICATIONS 1-7

PRODUCT SAFETY SERVICING GUIDELINES FOR VIDEO PRODUCTS

IMPORTANT SAFETY NOTICE

This manual was prepared for use only by properly trained audio-video service technicians.

When servicing this product, under no circumstances should the original design be modified or altered without permission from LG Electronics Corporation. All components should be replaced only with types identical to those in the original circuit and their physical location, wiring and lead dress must conform to original layout upon completion of repairs.

Special components are also used to prevent x-radiation, shock and fire hazard. These components are indicated by the letter “x” included in their component designators and are required to maintain safe performance. No deviations are allowed without prior approval by LG Electronics Corporation.

Circuit diagrams may occasionally differ from the actual circuit used. This way, implementation of the latest safety and performance improvement changes into the set is not delayed until the new service literature is printed.

CAUTION: Do not attempt to modify this product in any way. Never perform customized installations without manufacturer’s approval. Unauthorized modifications will not only void the warranty, but may lead to property damage or user injury.

Service work should be performed only after you are thoroughly familiar with these safety checks and servicing guidelines.

GRAPHIC SYMBOLS

The exclamation point within an equilateral triangle is intended to alert the service personnel to important safety information in the service literature.

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the service personnel to the presence of noninsulated “dangerous voltage” that may be of sufficient magnitude to constitute a risk of electric shock.

The pictorial representation of a fuse and its rating within an equilateral triangle is intended to convey to the service personnel the following fuse replacement caution notice:

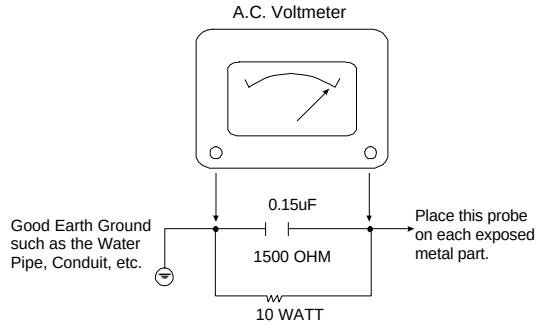
CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ALL FUSES WITH THE SAME TYPE AND RATING AS MARKED NEAR EACH FUSE.

SERVICE INFORMATION

While servicing, use an isolation transformer for protection from AC line shock. After the original service problem has been corrected, make a check of the following:

FIRE AND SHOCK HAZARD

1. Be sure that all components are positioned to avoid a possibility of adjacent component shorts. This is especially important on items trans-ported to and from the repair shop.
2. Verify that all protective devices such as insulators, barriers, covers, shields, strain reliefs, power supply cords, and other hardware have been reinstalled per the original design. Be sure that the safety purpose of the polarized line plug has not been defeated.
3. Soldering must be inspected to discover possible cold solder joints, solder splashes, or sharp solder points. Be certain to remove all loose foreign particles.
4. Check for physical evidence of damage or deterioration to parts and components, for frayed leads or damaged insulation (including the AC cord), and replace if necessary.
5. No lead or component should touch a high current device or a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces must be avoided.
6. After reassembly of the set, always perform an AC leakage test on all exposed metallic parts of the cabinet (the channel selector knobs, antenna terminals, handle and screws) to be sure that set is safe to operate without danger of electrical shock. DO NOT USE A LINE ISOLATION TRANSFORMER DURING THIS TEST. Use an AC voltmeter having 5000 ohms per volt or more sensitivity in the following manner: Connect a 1500 ohm, 10 watt resistor, paralleled by a .15 mfd 150V AC type capacitor between a known good earth ground water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1500 ohm resistor and .15 mfd capacitor. Reverse the AC plug by using a non-polarized adaptor and repeat AC voltage measurements for each exposed metallic part. Voltage measured must not exceed 0.75 volts RMS. This corresponds to 0.5 milliamp AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.



TIPS ON PROPER INSTALLATION

1. Never install any receiver in a closed-in recess, cubbyhole, or closely fitting shelf space over, or close to, a heat duct, or in the path of heated air flow.
2. Avoid conditions of high humidity such as: outdoor patio installations where dew is a factor, near steam radiators where steam leakage is a factor, etc.
3. Avoid placement where draperies may obstruct venting. The customer should also avoid the use of decorative scarves or other coverings that might obstruct ventilation.
4. Wall- and shelf-mounted installations using a commercial mounting kit must follow the factory-approved mounting instructions. A product mounted to a shelf or platform must retain its original feet (or the equivalent thickness in spacers) to provide adequate air flow across the bottom. Bolts or screws used for fasteners must not touch any parts or wiring. Perform leakage tests on customized installations.
5. Caution customers against mounting a product on a sloping shelf or in a tilted position, unless the receiver is properly secured.
6. A product on a roll-about cart should be stable in its mounting to the cart. Caution the customer on the hazards of trying to roll a cart with small casters across thresholds or deep pile carpets.
7. Caution customers against using extension cords. Explain that a forest of extensions, sprouting from a single outlet, can lead to disastrous consequences to home and family.

SERVICING PRECAUTIONS

CAUTION: Before servicing the VCR + DVD RECODER covered by this service data and its supplements and addends, read and follow the *SAFETY PRECAUTIONS. NOTE:* if unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions in this publications, always follow the safety precautions.
Remember Safety First:

General Servicing Precautions

1. Always unplug the VCR + DVD RECODER AC power cord from the AC power source before:
   (1) Removing or reinstalling any component, circuit board, module, or any other assembly.
   (2) Disconnecting or reconnecting any internal electrical plug or other electrical connection.
   (3) Connecting a test substitute in parallel with an electrolytic capacitor.
   Caution: A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.

2. Do not spray chemicals on or near this VCR + DVD RECODER or any of its assemblies.

3. Unless specified otherwise in this service data, clean electrical contacts by applying an appropriate contact cleaning solution to the contacts with a pipe cleaner, cotton-tipped swab, or comparable soft applicator.
   Unless specified otherwise in this service data, lubrication of contacts is not required.

4. Do not defeat any plug/socket B+ voltage interlocks with whitch instruments covered by this service manual might be equipped.

5. Do not apply AC power to this VCR + DVD RECODER and / or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.

6. Always connect the test instrument ground lead to an appropriate ground before connecting the test instrument positive lead. Always remove the test instrument ground lead last.

Insulation Checking Procedure

Disconnect the attachment plug from the AC outlet and turn the power on. Connect an insulation resistance meter (500V) to the blades of the attachment plug. The insulation resistance between each blade of the attachment plug and accessible conductive parts (Note 1) should be more than 1M-ohm.
Note 1: Accessible Conductive Parts include Metal panels, Input terminals, Earphone jacks,etc.

Electrostatically Sensitive (ES) Devices

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field effect transistors and semiconductor chip components.
The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.

2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.

3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.

4. Use only an anti-static solder removal device. Some solder removal devices not classified as “anti-static” can generate electrical charges sufficient to damage ES devices.

5. Do not use freon-propelled chemicals. These can generate an electrical charge sufficient to damage ES devices.

6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil,or comparable conductive material).

7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

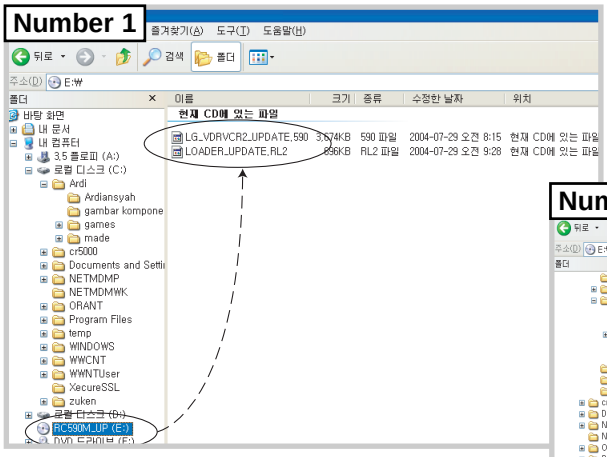
   Caution: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

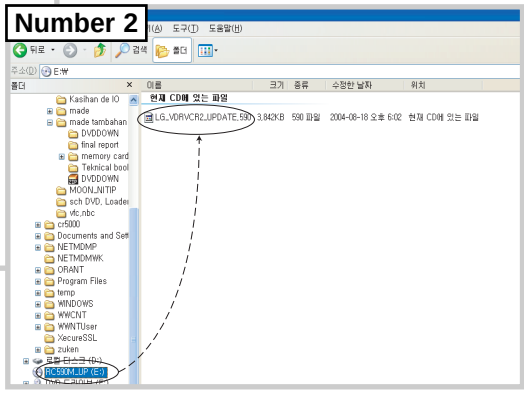
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Normally harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

UP-DATING PROGRAM

BURNING DISC

- For up-dating the DVD program using the disc, it must burning the disc which include the DVD software.
- For recorder combi set which using the disc downloader program are DVD Program and Loader Program.
- In 2nd generation for recorder combi can download the DVD program and Loader program one by one, or all together.





* There is two way to format disc DVD Program
1. DVD and LOADER program format in one disc
2. Only DVD program format in one disc

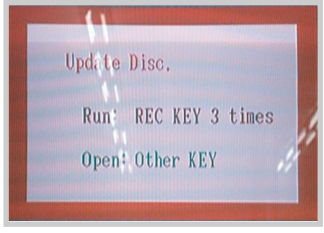
- If you format like number 1 you'll see capture like (figure 1)
- And you have three choice:
  1. Main. It's mean if you chose this it'll up-dating only DVD prgram.
  2. Loader.It's mean if you chose this it'll up-dating only Loader program.
  3. ALL. It's mean if you chose this it'll up-dating DVD and Loader program.

- If you format like number 2 you'll not see capture like figure 1 that give you choices, you have no choice only update DVD program

DVD UPGRADE INSTRUCTION

FORMAT NO 1

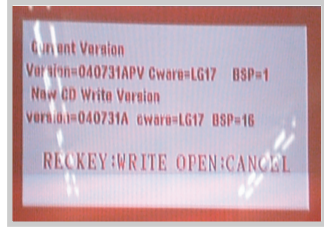
1. Press POWER KEY to turn on.
2. After booting, insert the upgrade disc, and you will see massage like [FIGURE 1]
3. Press “REC” key (front or remote) 3 times and you will see as [FIGURE 2] with remote Chose one of them then Press enter
4. For update both of them [MAIN & LOADER] we chose “ALL” and first you will see [FIGURE 3] DVD update
   → Check the “Current Version” and “ New CD Write Version” and press “REC” key.
5. The DVD update will be on progress.And when finish update MAIN Version it’s automatically continue to Update Loader Version and You will see [FIGURE 4]
   → Check the “Current Version” and “New CD Write Version “ and Press “REC” key once more
6. The LOADER update will be on progress. And tray will open.
7. Remove the disc and wait until finish
8. The tray will be close and open automatically after completing “UNDER UPDATE” 100%
9. Turn off the unit
10. Turn on again the unit is operation with new software



[FIGURE 1]

[FIGURE 2]

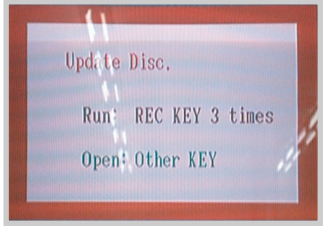
[FIGURE 3]



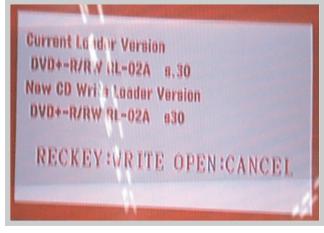
[FIGURE 4]

FORMAT NO 2

1. Press POWER KEY to turn on.
2. After booting, insert the upgrade disc, and you will see massage like [FIGURE 1]
3. Press “REC” key (front or remote) 3 times
4. The DVD update will be on progress.
   → Check the “Current Version” and “New CD Write Version “ and Press “REC” key once more
5. The tray will be open automatically after completing “UNDER UPDATE” 100%
6. Remove the disc andTurn off the unit
7. Turn on again the unit is operation with new software



[FIGURE 1]



[FIGURE 2]

SPECIFICATIONS

General	
Power requirements	AC 200-240V, 50/60 Hz
Power consumption	27W
Dimensions (approx.)	430 X 78.5 X 310 mm (w x h x d)
Mass (approx.)	5.2 kg
Operating temperature	5°C to 35°C
Operating humidity	5 % to 90 %
Television system	PAL B/G, PAL I/I, SECAM D/K colour system
Recording format	PAL
SYSREM	
Laser	Semiconductor laser, wavelength 650 nm
Video head system	Double azimuth 4 heads, helical scanning
Signal system	PAL
Recording	
Recording format	VD VideoRecording, DVD-VIDEO
Recordable discs	DVD-ReWritable, DVD-Recordable, DVD+ReWritable, DVD+Recordable
Recordable time	Approx. 1 hour 20 minutes (XP mode), 2 hours (SP mode), 4 hours (LP mode), 6 hours (EP mode)
Video recording format	
Sampling frequency	27MHz
Compression format	MPEG 2
Audio recording format	
Sampling frequency	48kHz
Compression format	Dolby Digital
Playback	
Frequency response	DVD (PCM 48 kHz): 8 Hz to 22 kHz, CD: 8 Hz to 20 kHz DVD (PCM 96 kHz): 8 Hz to 44 kHz
Signal-to-noise ratio	More than 100 dB (AUDIO OUT connector)
Harmonic distortion	Less than 0.008% (AUDIO OUT connector)
Dynamic range	More than 95 dB (AUDIO OUT connector)
Inputs	
AERIAL IN	Aerial input, 75 ohms
VIDEO IN	1.0 Vp-p 75 ohms, sync negative, RCA jack x 1 / SCART x 2
AUDIO IN	0 dBm more than 47 kohms, RCA jack (L, R) x 1 / SCART x 2
DV IN	4 pin (IEEE 1394 standard)
S-VIDEO IN	(Y) 1.0 V (p-p), 75 Ω, negative sync, Mini DIN 4-pin x 1 (C) 0.3 V (p-p) 75 Ω
Outputs	
VIDEO OUT	1.0 Vp-p 75 ohms, sync negative, SCART x 2
S-VIDEO OUT	(Y) 1.0 V (p-p), 75 Ω, negative sync, Mini DIN 4-pin x 1 (C) 0.3 V (p-p) 75 Ω
COMPONENT VIDEO OUT	(Y) 1.0 V (p-p), 75 Ω, negative sync, RCA jack x 1 (Pb)/(Pr) 0.7 V (p-p), 75 Ω, RCA jack x 2
Audio output (digital audio)	0.5 V (p-p), 75 Ω, RCA jack x 1
Audio output (optical audio)	3 V (p-p), 75 Ω, Optical connector x 1
Audio output (analog audio)	2.0 Vrms (1 KHz, 0 dB), 600 Ω, RCA jack (L, R) x 1 / SCART

SECTION 2

EXPLODED VIEWS

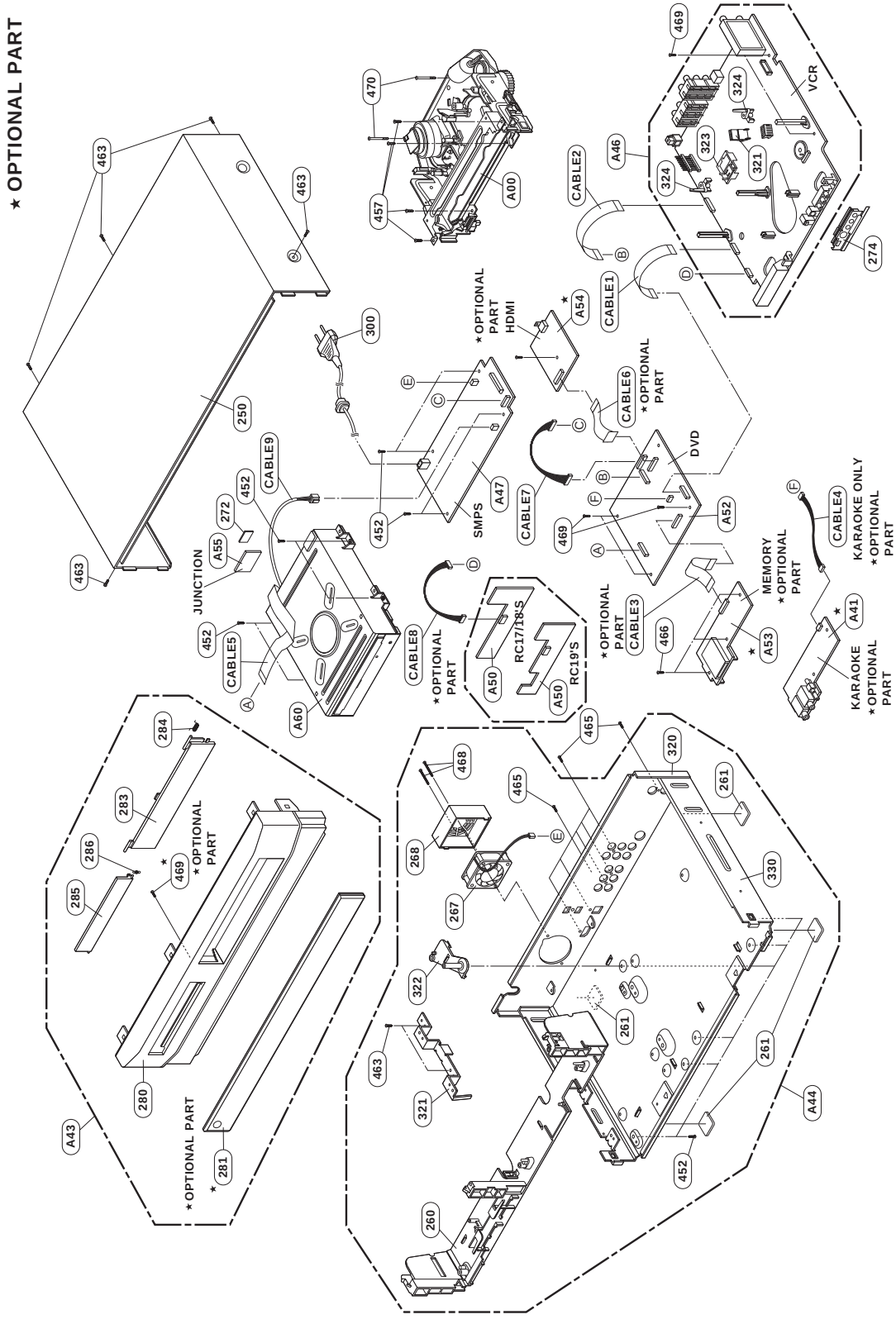
CONTENTS

EXPLODED VIEWS 2-2

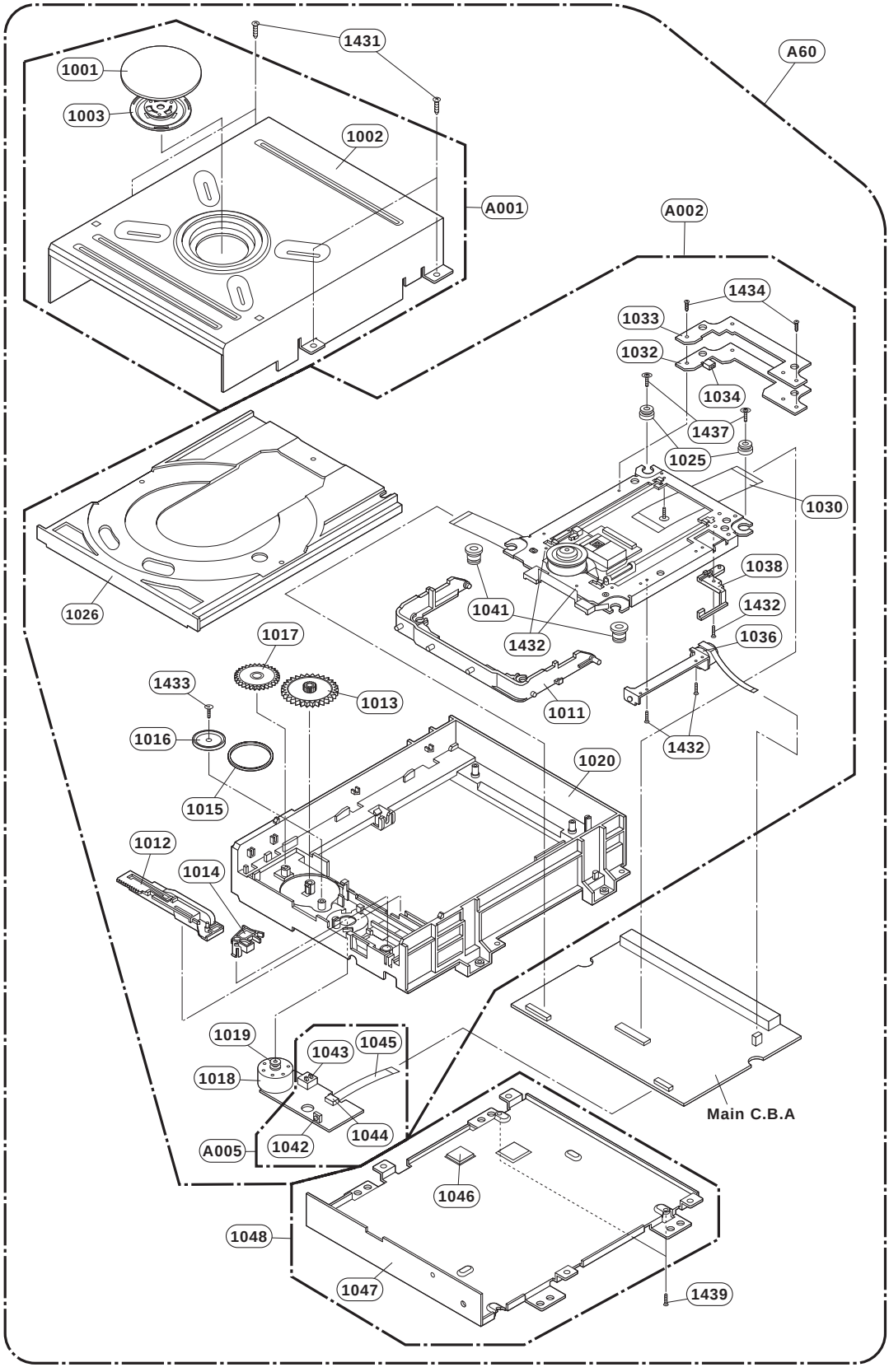
1. CABINET AND MAIN FRAME SECTION 2-2
2. DECK MECHANISM SECTION(RS-01A) 2-3
3. DECK MECHANISM SECTION(D37(N)) 2-4
4. PACKING ACCESSORY SECTION 2-7

EXPLODED VIEWS

1. CABINET AND MAIN FRAME SECTION

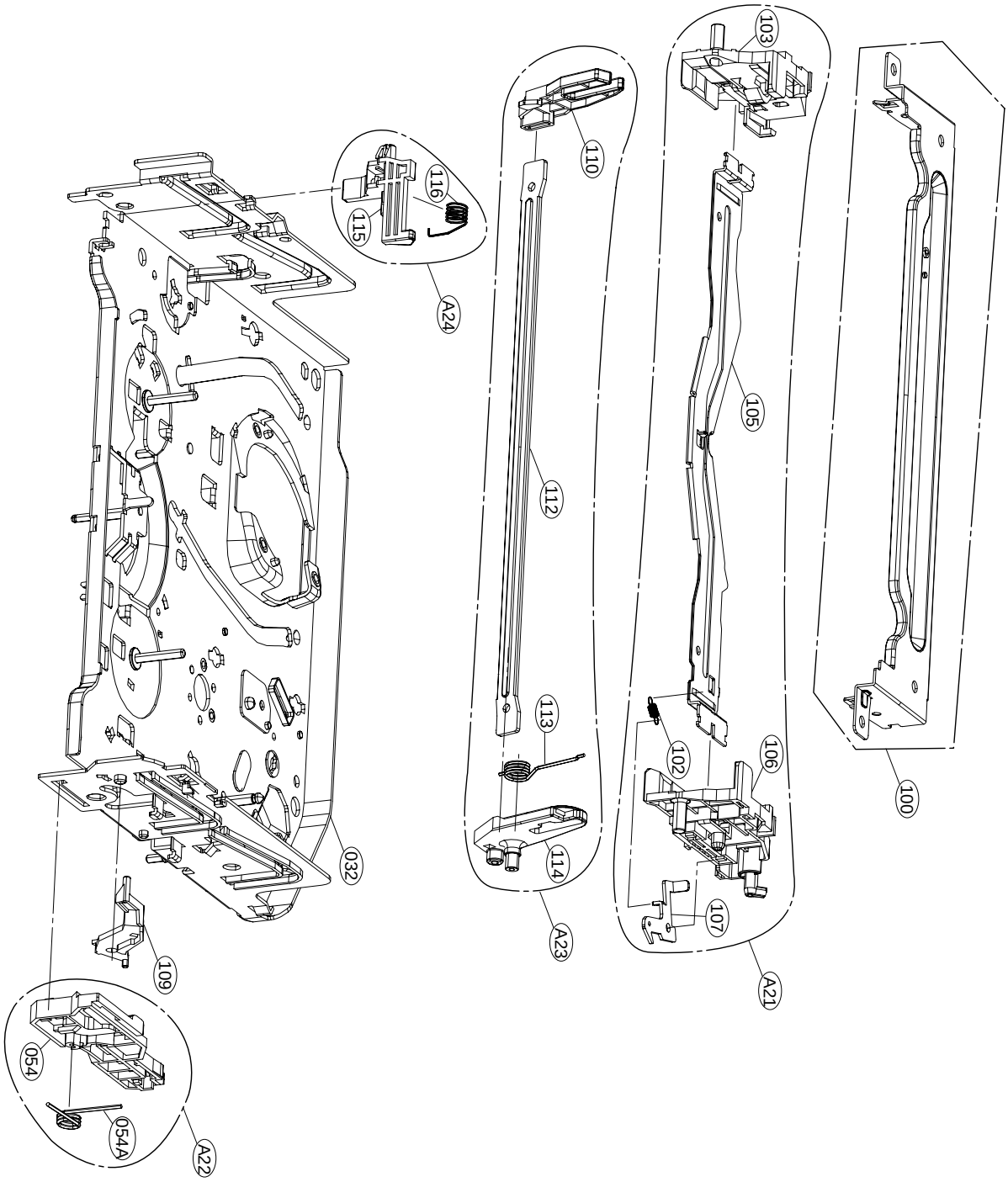


2. DECK MECHANISM SECTION(RS-01A)



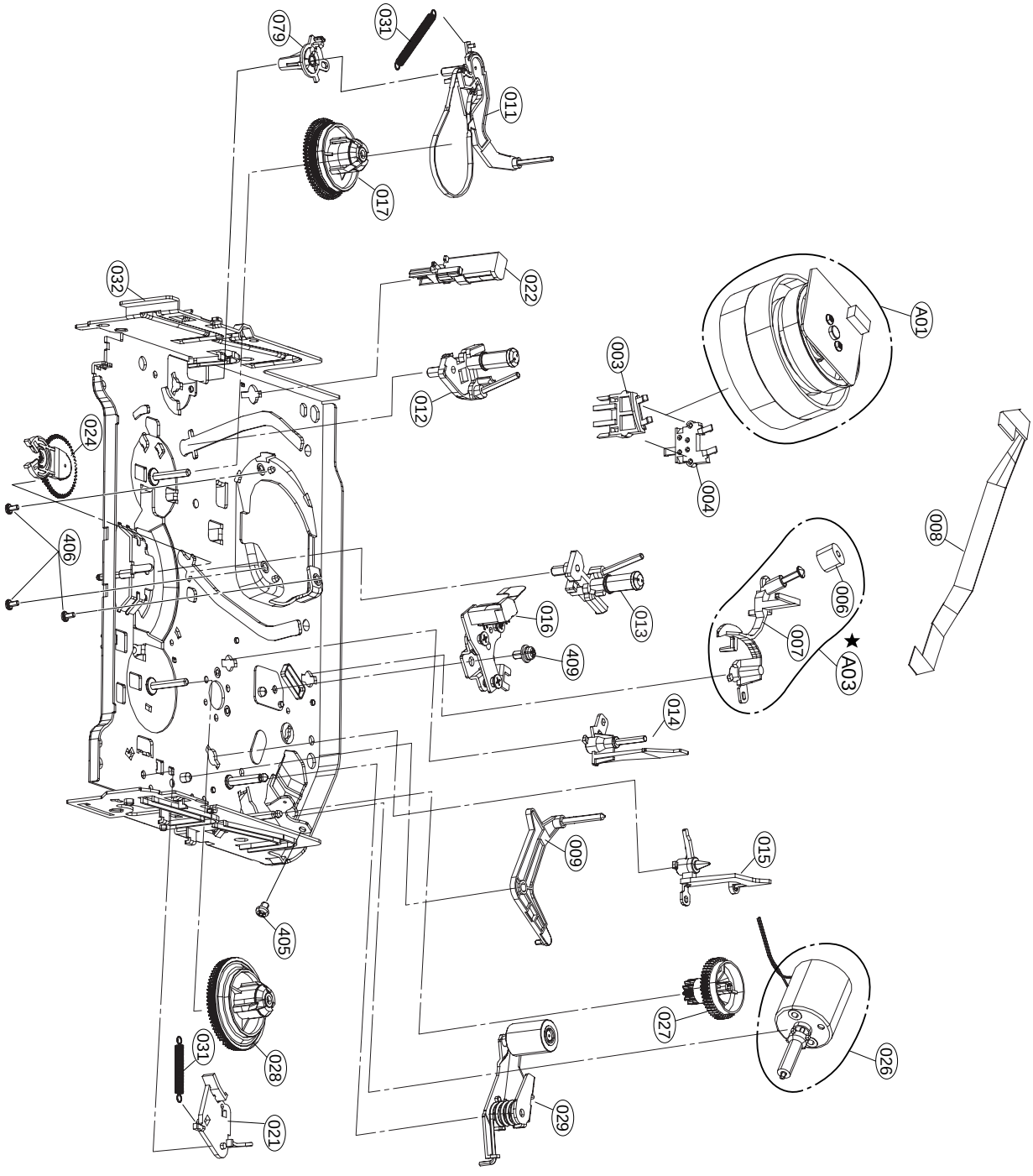
3. DECK MECHANISM SECTION(D37(N))

1) FRONT LOADING MECHANISM SECTION

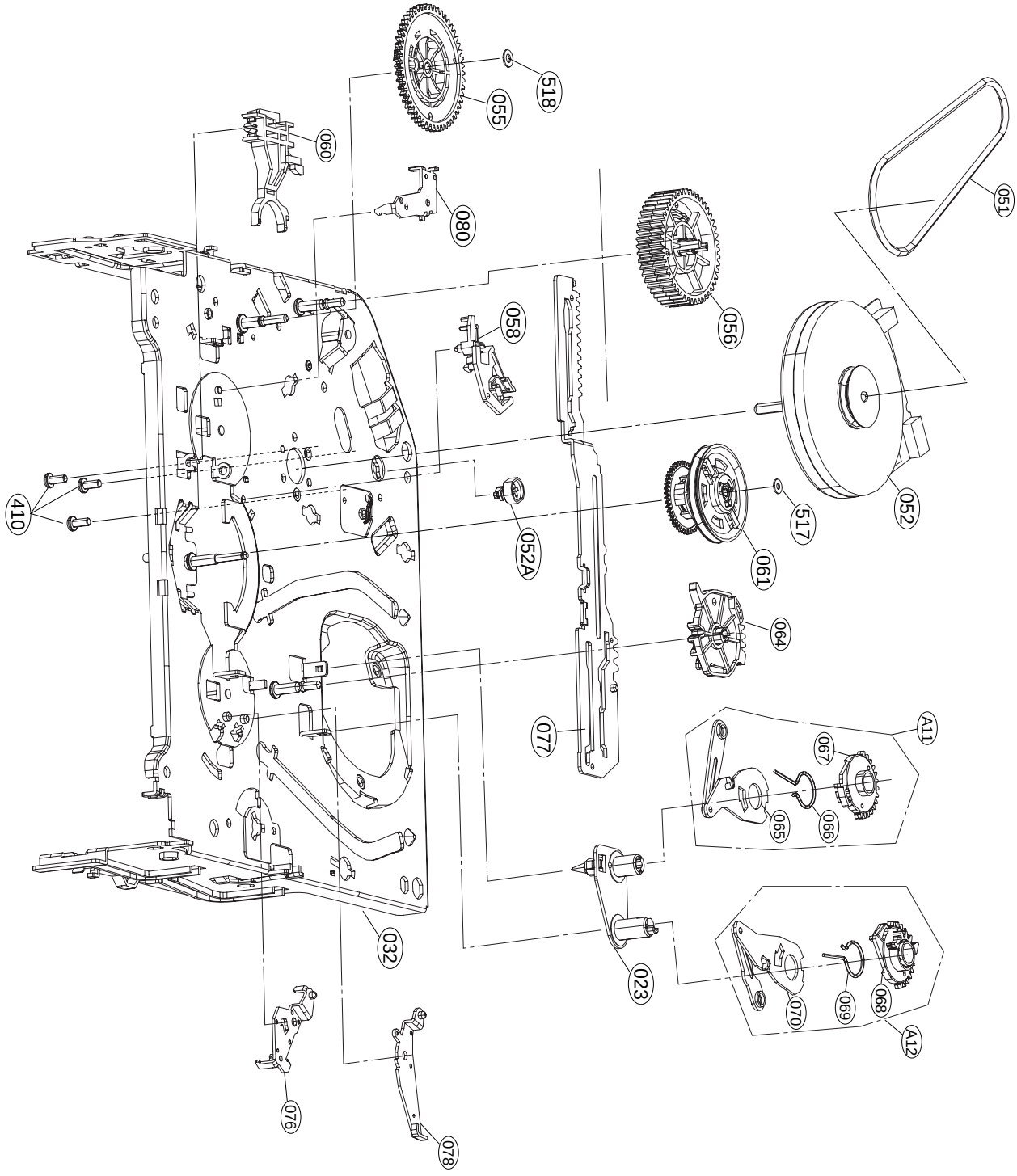


2) MOVING MECHANISM SECTION (1)

★ OPTIONAL PART

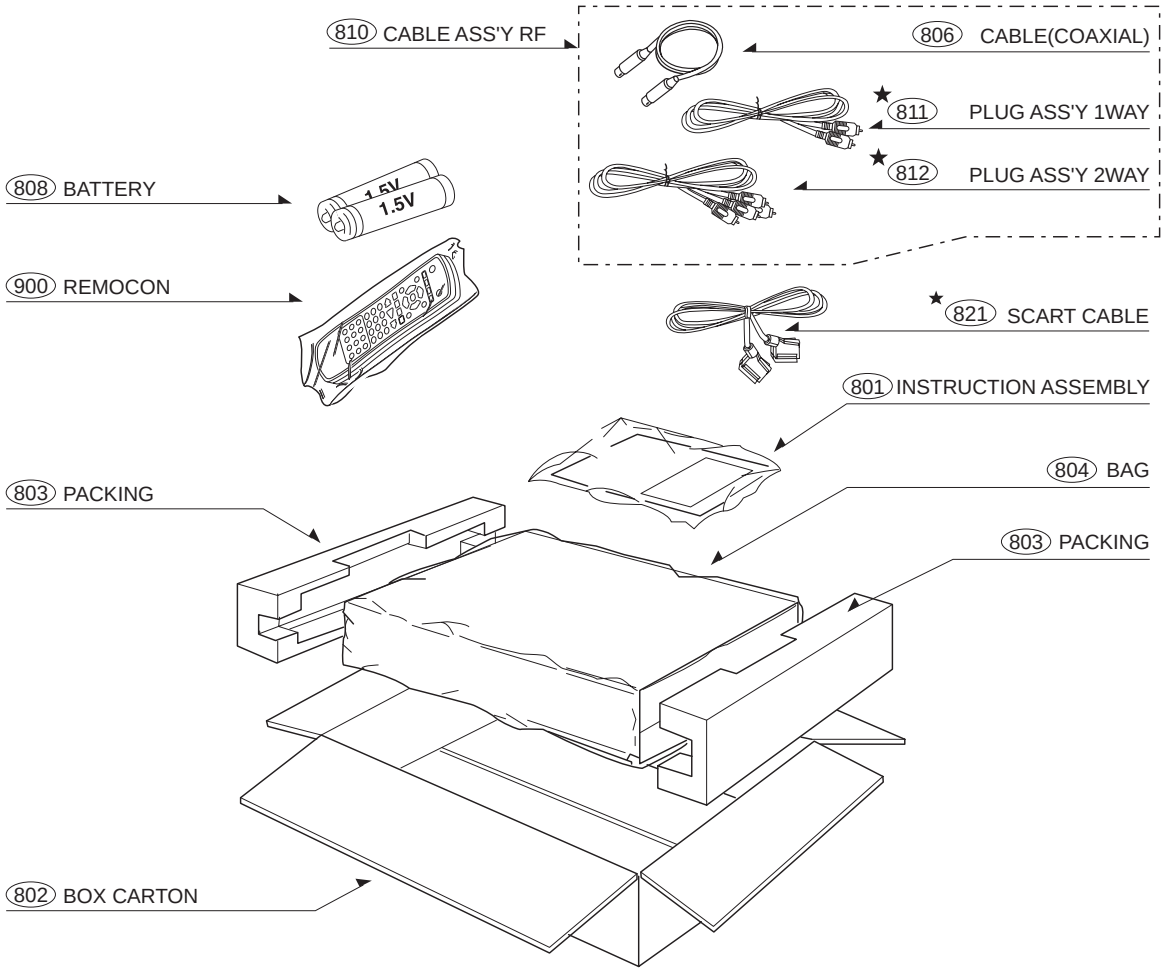


3) MOVING MECHANISM SECTION (2)



4. PACKING ACCESSORY SECTION

★OPTIONAL PARTS



SECTION 3
ELECTRICAL

CONTENTS

OVERALL WIRING DIAGRAM.....3-2

VCR PART

ELECTRICAL ADJUSTMENT PROCEDURES.....3-3

VCR ELECTRICAL TROUBLESHOOTING GUIDE.....3-4
- 1. POWER(SMPS) CIRCUIT.....3-4
- 2. SYSTEM/KEY CIRCUIT.....3-7
- 3. SERVO CIRCUIT.....3-8
- 4. Y/C CIRCUIT.....3-11
- 5. HI-FI CIRCUIT.....3-15
- 6. TUNER/IF CIRCUIT.....3-18

BLOCK DIAGRAMS.....3-20
- 1. POWER(SMPS) BLOCK DIAGRAM.....3-20
- 2. TU/IF BLOCK DIAGRAM.....3-22
- 3. VPS BLOCK DIAGRAM.....3-23
- 4. Y/C BLOCK DIAGRAM.....3-24
- 5. HI-FI BLOCK DIAGRAM.....3-26
- 6. SYSTEM BLOCK DIAGRAM.....3-28
- 7. SCART & SWICH BLOCK DIAGRAM.....3-30

CIRCUIT DIAGRAMS.....3-32
- 1. POWER(SMPS) CIRCUIT DIAGRAM.....3-32
- 2. TUNER CIRCUIT DIAGRAM.....3-34
- 3. A/V CIRCUIT DIAGRAM.....3-36
- 4. HI-FI CIRCUIT DIAGRAM.....3-38
- 5. SYSTEM CIRCUIT DIAGRAM.....3-40
- 6. SCART CIRCUIT DIAGRAM (SCART MODEL ONLY).....3-42
- 7. KEY CIRCUIT DIAGRAM.....3-44
- 8. KARAOKE CIRCUIT IAGRAM (KARAOKE MODEL ONLY).....3-46
- 9. HDMI CIRCUIT DIAGRAM (HDMI MODEL ONLY).....3-48
- • WAVEFORMS.....3-50
- • CIRCUIT VOLTAGE CHART.....3-52

PRINTED CIRCUIT DIAGRAMS.....3-56
- 1. VCR P.C.BOARD(TOP VIEW).....3-56
- 2. VCR P.C.BOARD(BOTTOM VIEW).....3-58
- 3. SMPS P.C.BOARD.....3-60
- 4. HDMI P.C.BOARD(HDMI MODEL ONLY).....3-62
- 5. KARAOKE P.C.BOARD (KARAOKE MODEL ONLY).....3-62
- 6. KEY P.C.BOARD.....3-64

VDR PART

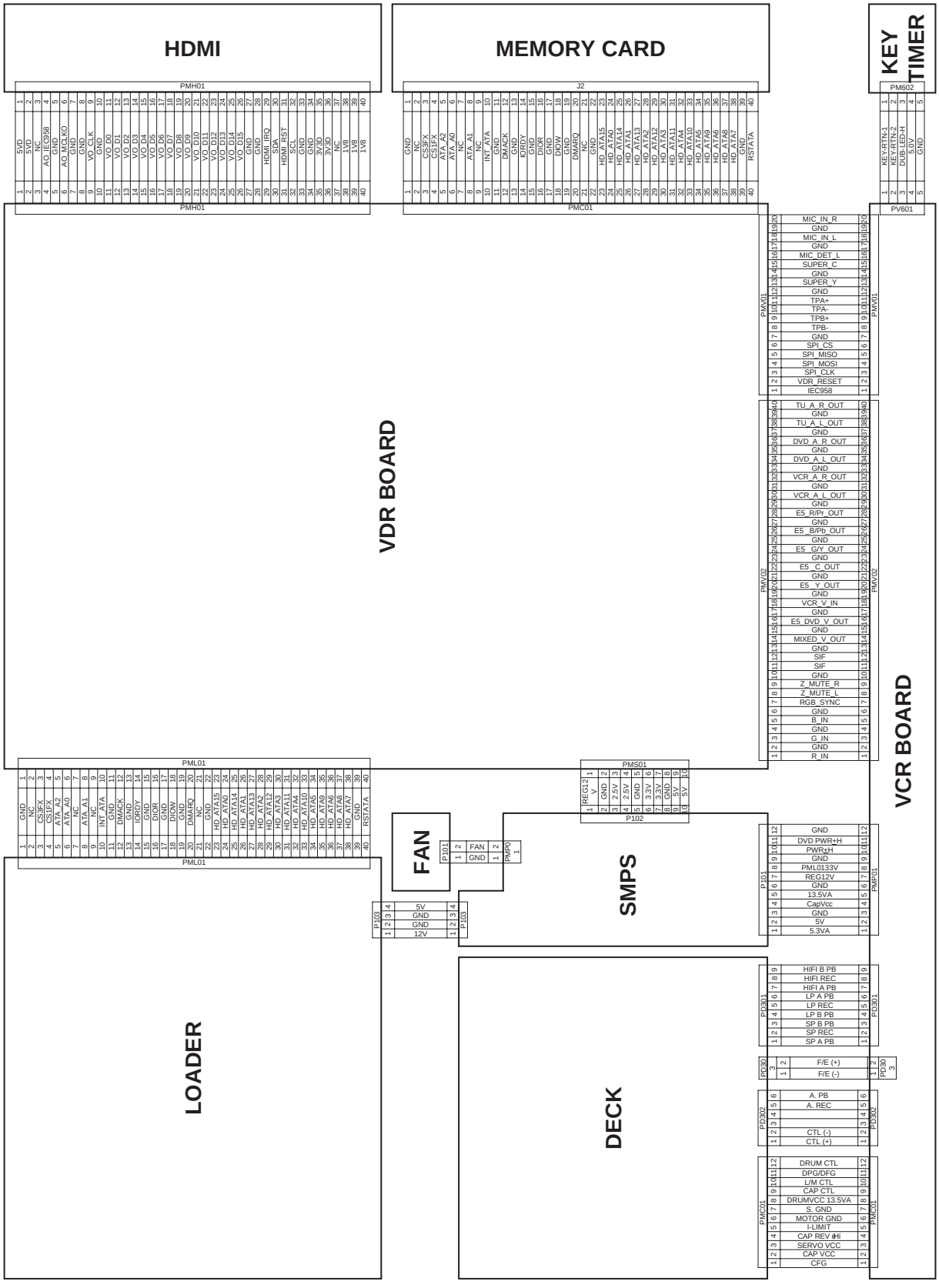
VDR ELECTRICAL TROUBLESHOOTING GUIDE.....3-66
- 1. POWER(SMPS) CIRCUIT.....3-66
- 2. NO COMPONENT VIDEO SIGNAL WHEN PLAYING DISC.....3-69
- 3. NO COMPOSITE / S-VIDEO SIGNAL WHEN PLAYING DISC.....3-70
- 4. NO TV, EXTERNAL INPUT VIDEO SIGNAL.....3-71
- 5. WHEN PLAYING DISC, NO AUDIO OUTPUT.....3-72
- 6. NO OPTICAL / DIGITAL OUTPUT.....3-73
- 7. NO TUNER AUDIO OUTPUT.....3-74
- 8. NO EXTERNAL INPUT 1, 2, 3 AUDIO.....3-75

BLOCK DIAGRAMS.....3-76
- 1. VDR SET TOTAL BLOCK DIAGRAM.....3-76
- 2. VDR MAIN H/ W BLOCK DIAGRAM.....3-77
- 3. POWER BLOCK DIAGRAM.....3-78
- 4. AUDIO IN/OUT BLOCK DIAGRAM.....3-79
- 5. CPU & CONTROL REGISTER & MEMORY SLOT BLOCK DIAGRAM.....3-80
- 6. VIDEO IN/OUT BLOCK DIAGRAM.....3-81
- 7. DV1394 IN/OUT BLOCK DIAGRAM.....3-82
- 8. MEMORY CARD IN/OUT BLOCK DIAGRAM.....3-83

CIRCUIT DIAGRAMS.....3-84
- 1. BGA 308P CIRCUIT DIAGRAM.....3-84
- 2. DDR & B TO B CONNECTOR CIRCUIT DIAGRAM.....3-86
- 3. POWER, FLASH, CONNECTOR CIRCUIT DIAGRAM.....3-88
- 4. RST, CONTROL/STATUS_REG., ATAPI, HOST_CPLD, LATCH CIRCUIT DIAGRAM.....3-90
- 5. VIDEO/AUDIO CODEC, MSP CIRCUIT DIAGRAM.....3-92
- 6. DV1394, MEMORY, HDMI CIRCUIT DIAGRAM...3-94
- • WAVEFORMS.....3-96
- • CIRCUIT VOLTAGE CHART.....3-98

PRINTED CIRCUIT DIAGRAMS.....3-100
- 1. VDR P.C.BOARD(TOP VIEW).....3-100
- 2. VDR P.C.BOARD(BOTTOM VIEW).....3-102

OVERALL WIRING DIAGRAMS



VCR PART
ELECTRICAL ADJUSTMENT PROCEDURES

1. Servo Adjustment

1) PG Adjustment

• Test Equipment
a) OSCILLOSCOPE : PAL SP TEST TAPE

• Adjustment And Specification

MODE	MEASUREMENT POINT	ADJUSTMENT POINT	SPECIFICATION
PLAY	V.Out H/SW(TP)	R/C TRK JIG KEY	6.5 ± 0.5H

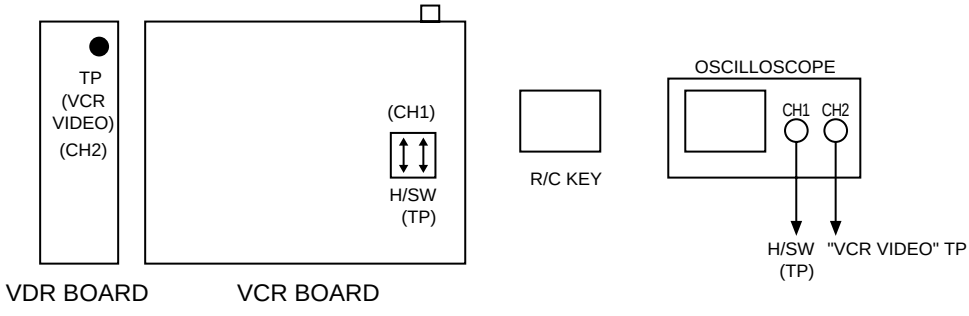
• Adjustment Procedure

a) Insert the SP Test Tape and play.
b) Connect the CH1 of the oscilloscope to the H/SW and CH2 to the “VCR VIDEO” TP for the VCR.
c) Trigger the mixed Combo Video Signal of CH2 to the CH1 H/SW, and then check the distance (time difference), which is from the selected A(B) Head point of the H/SW signal to the starting point of the vertical synchronized signal, to 6.5H ± 0.5H (416µs, 1H=64µs).

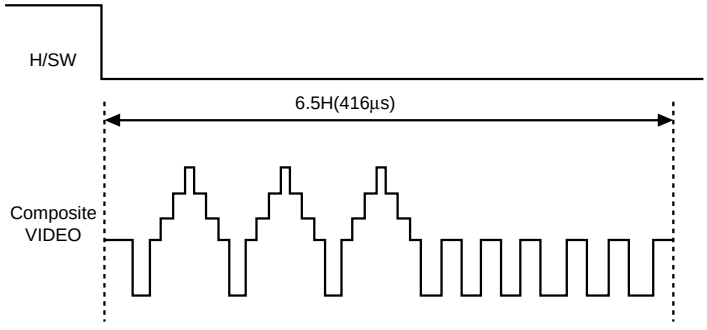
• PG Adjustment Method

a-1) Playback the SP standard tape
b-2) Wait for 3seconds with F/P “REC” key and “PLAY” key presseed at the same time. < Digitron[- -] >
c-3) Repeat the above step(No.b-2), then it finishes the PG adjusting automatically. < Digitron[PG] >
d-4) Stop the playback, then it goes out of PG adjusting mode after mony the PG data.

• CONNECTION

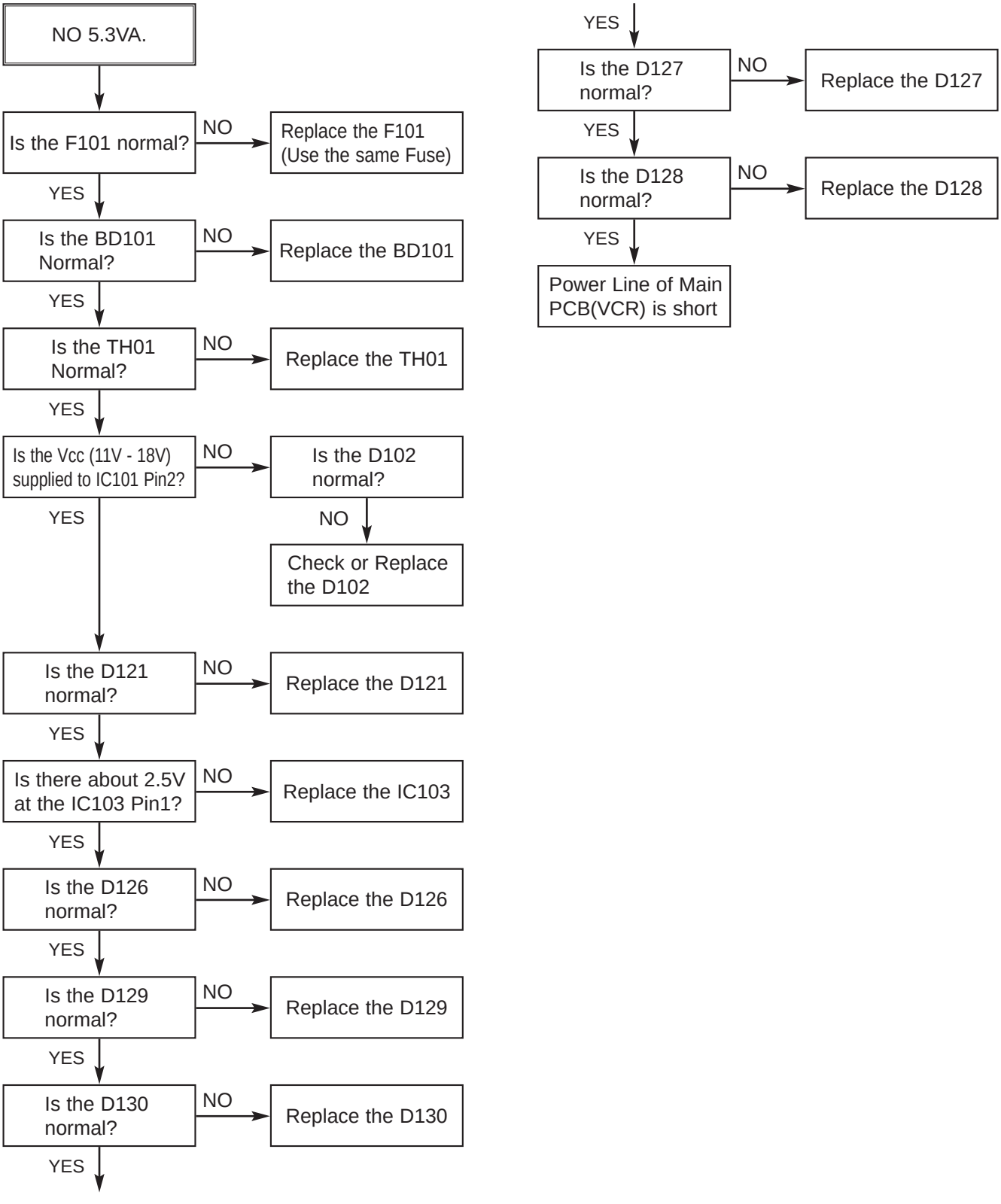


• WAVEFORM

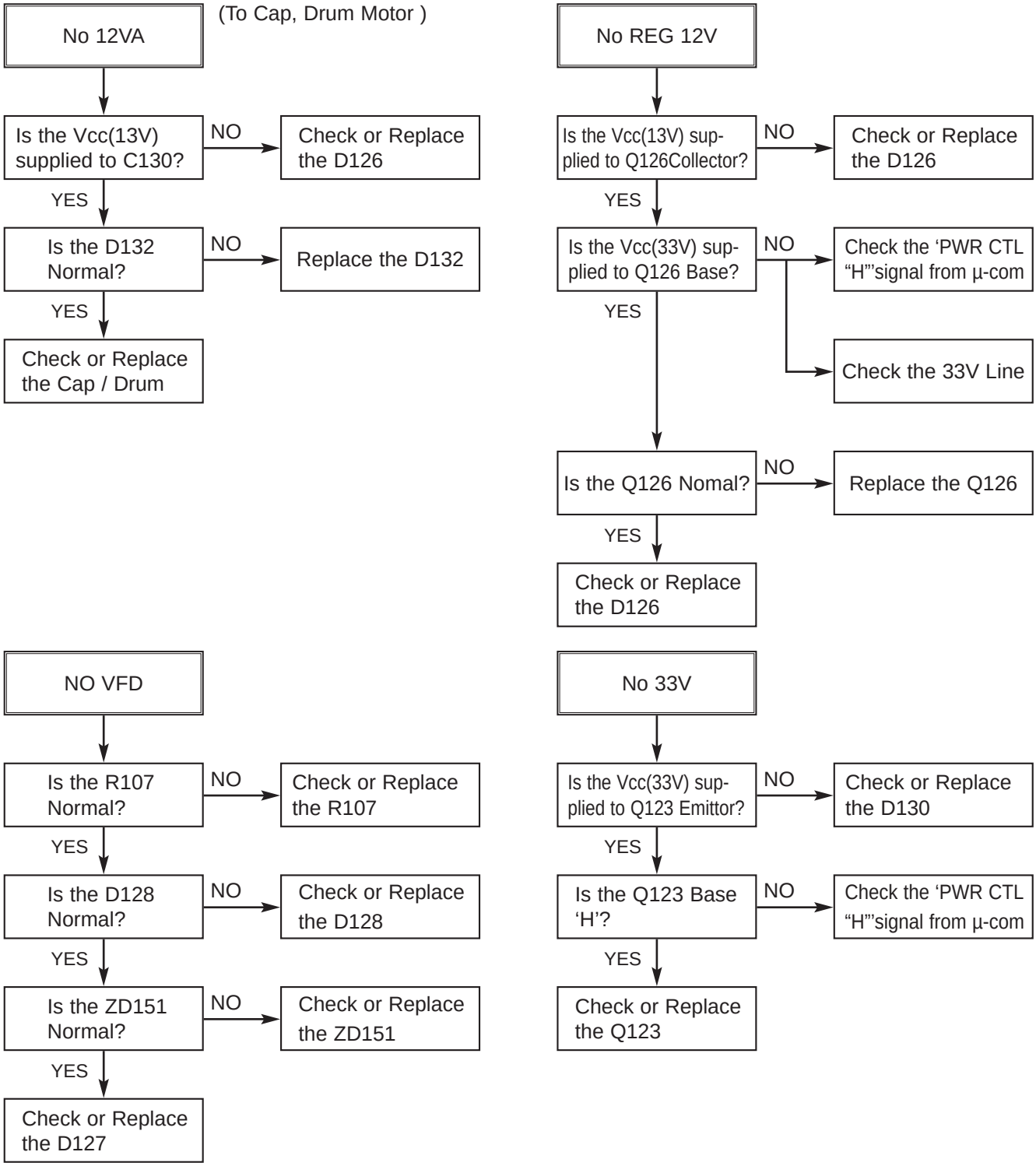


VCR ELECTRICAL TROUBLESHOOTING GUIDE

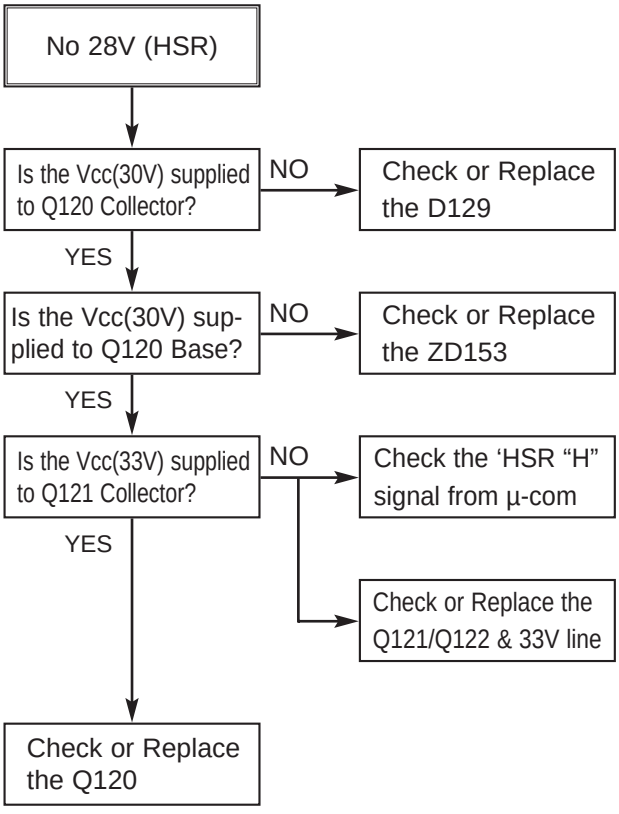
1. Power(SMPS) CIRCUIT



VCR ELECTRICAL TROUBLESHOOTING GUIDE



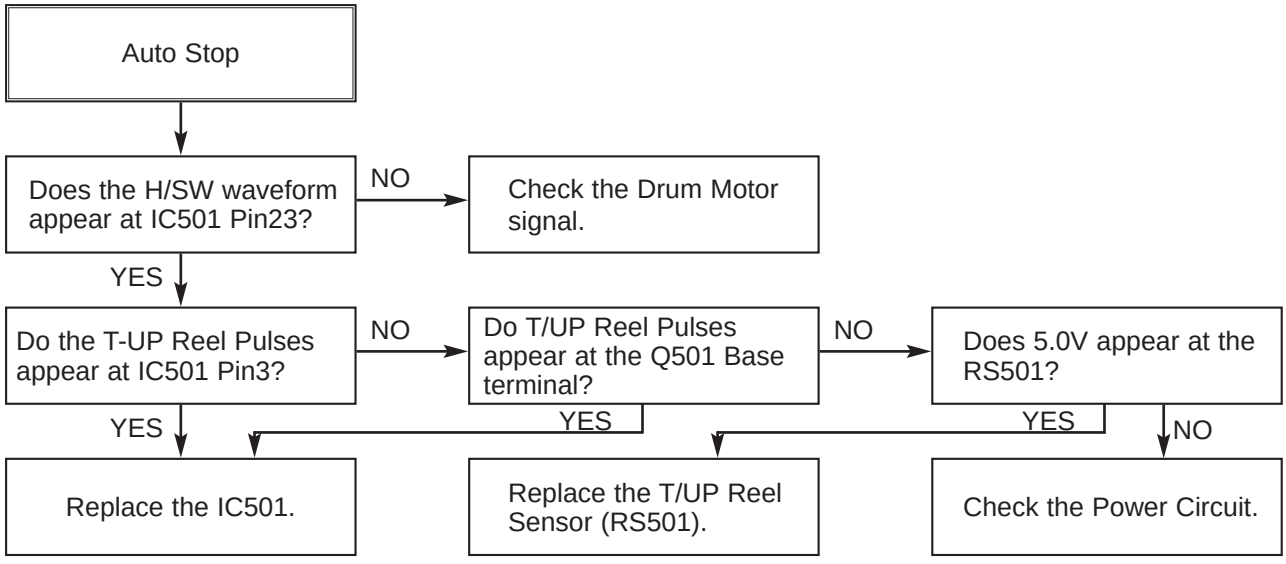
VCR ELECTRICAL TROUBLESHOOTING GUIDE



VCR ELECTRICAL TROUBLESHOOTING GUIDE

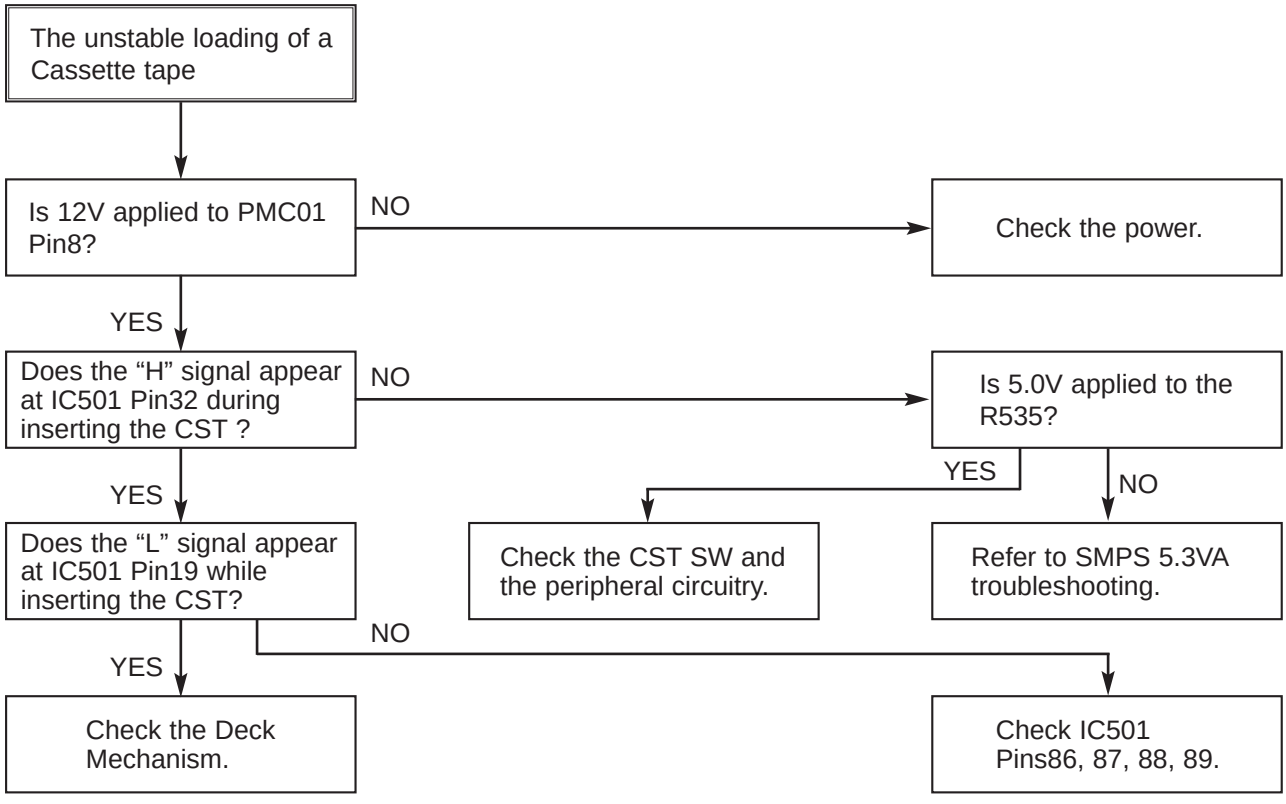
2. SYSTEM/KEY CIRCUIT

(1) AUTO STOP



Note : Auto stop can occur because Grease or Oil has dried up

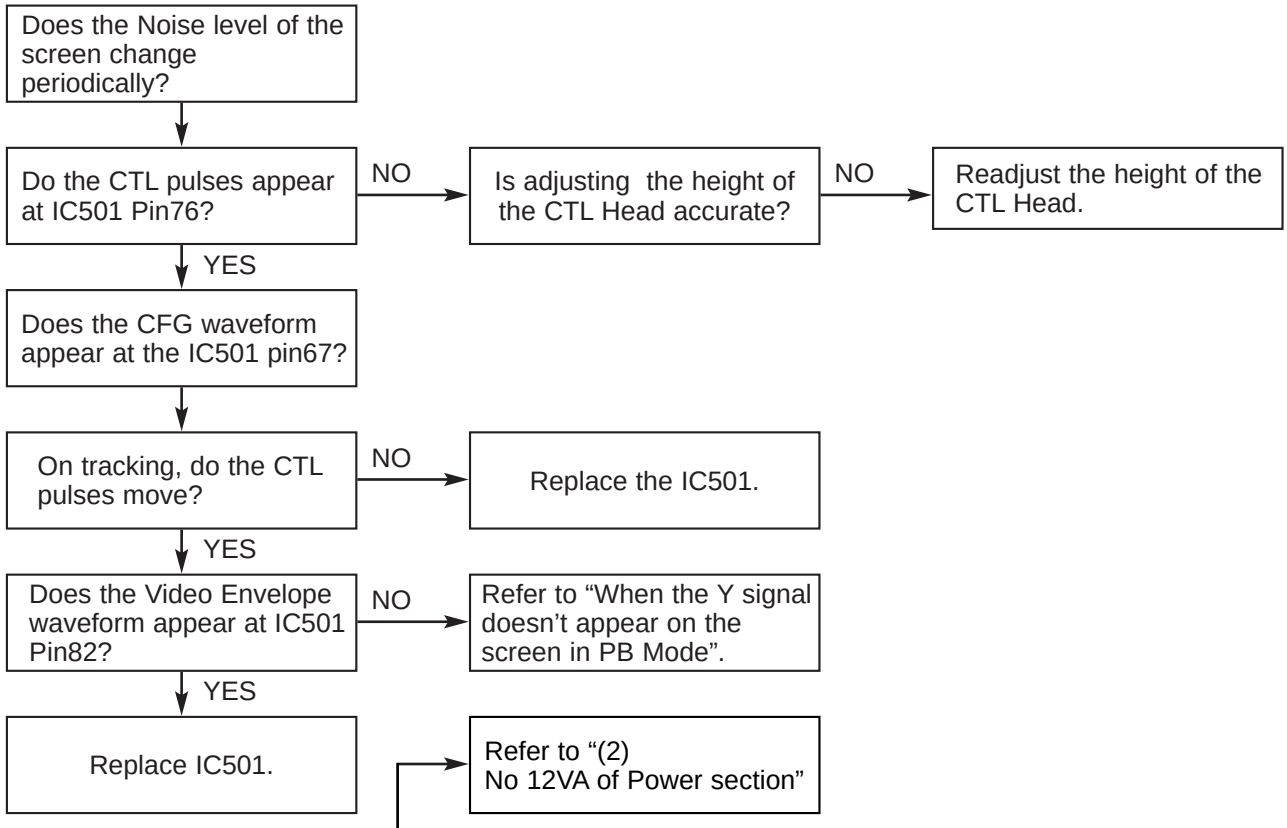
(2) The unstable loading of a Cassette tape



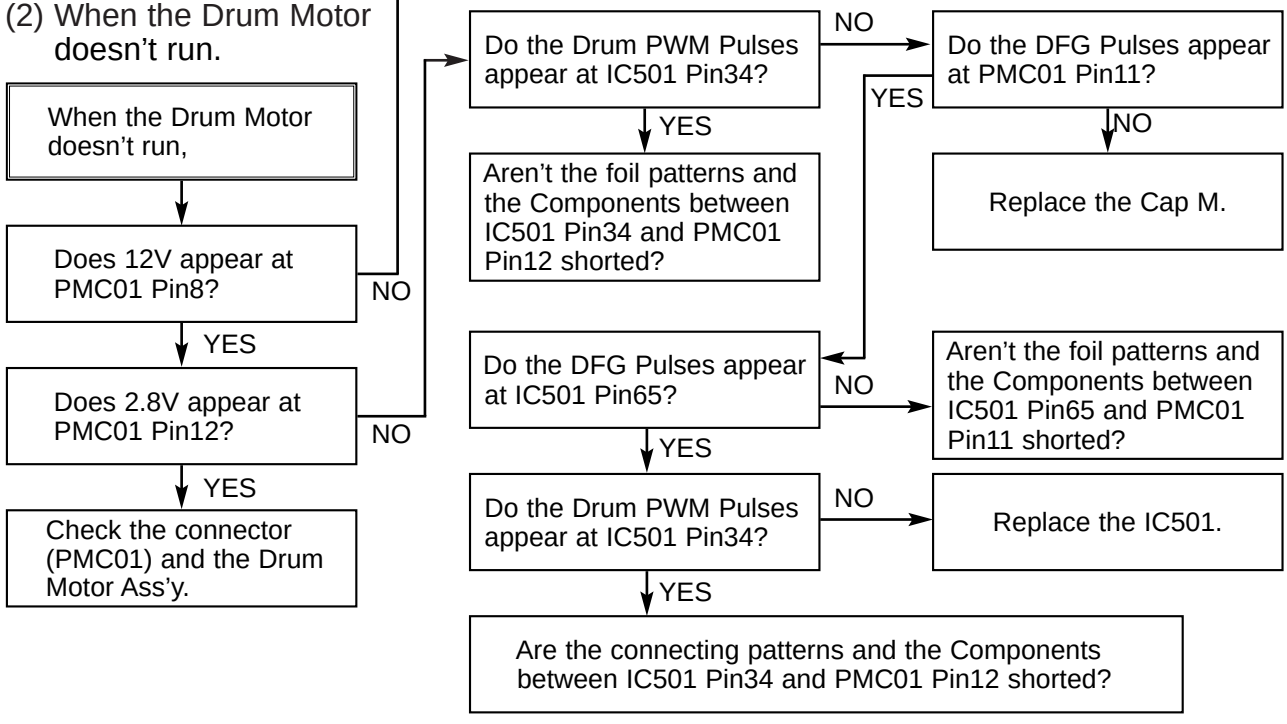
VCR ELECTRICAL TROUBLESHOOTING GUIDE

3. SERVO CIRCUIT

(1) Unstable Video in PB MODE

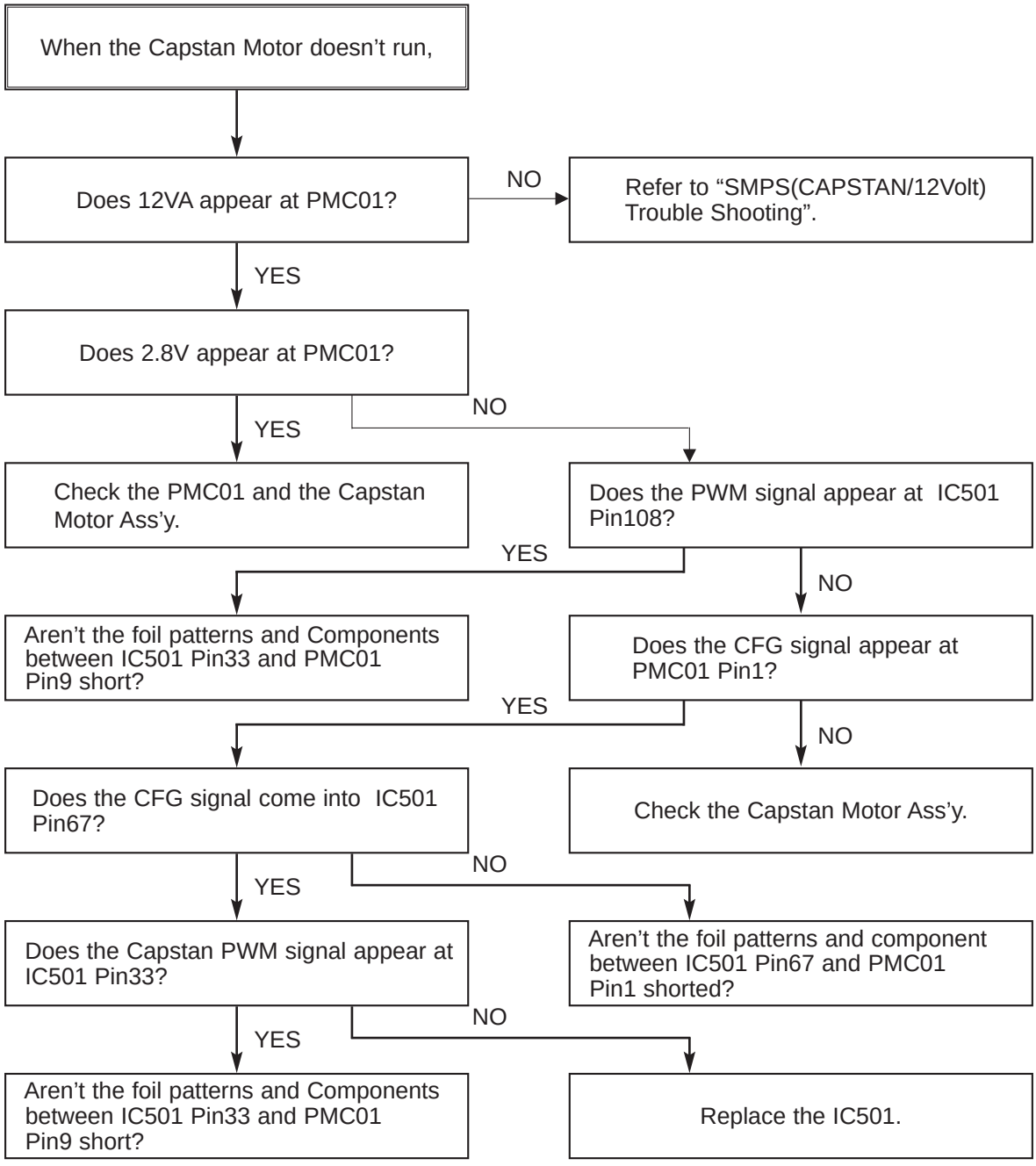


(2) When the Drum Motor doesn't run.

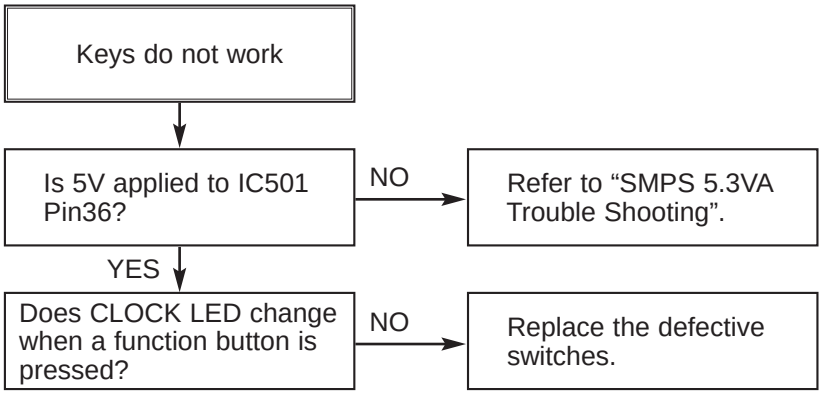


VCR ELECTRICAL TROUBLESHOOTING GUIDE

(3) When the Capstan Motor doesn't run,



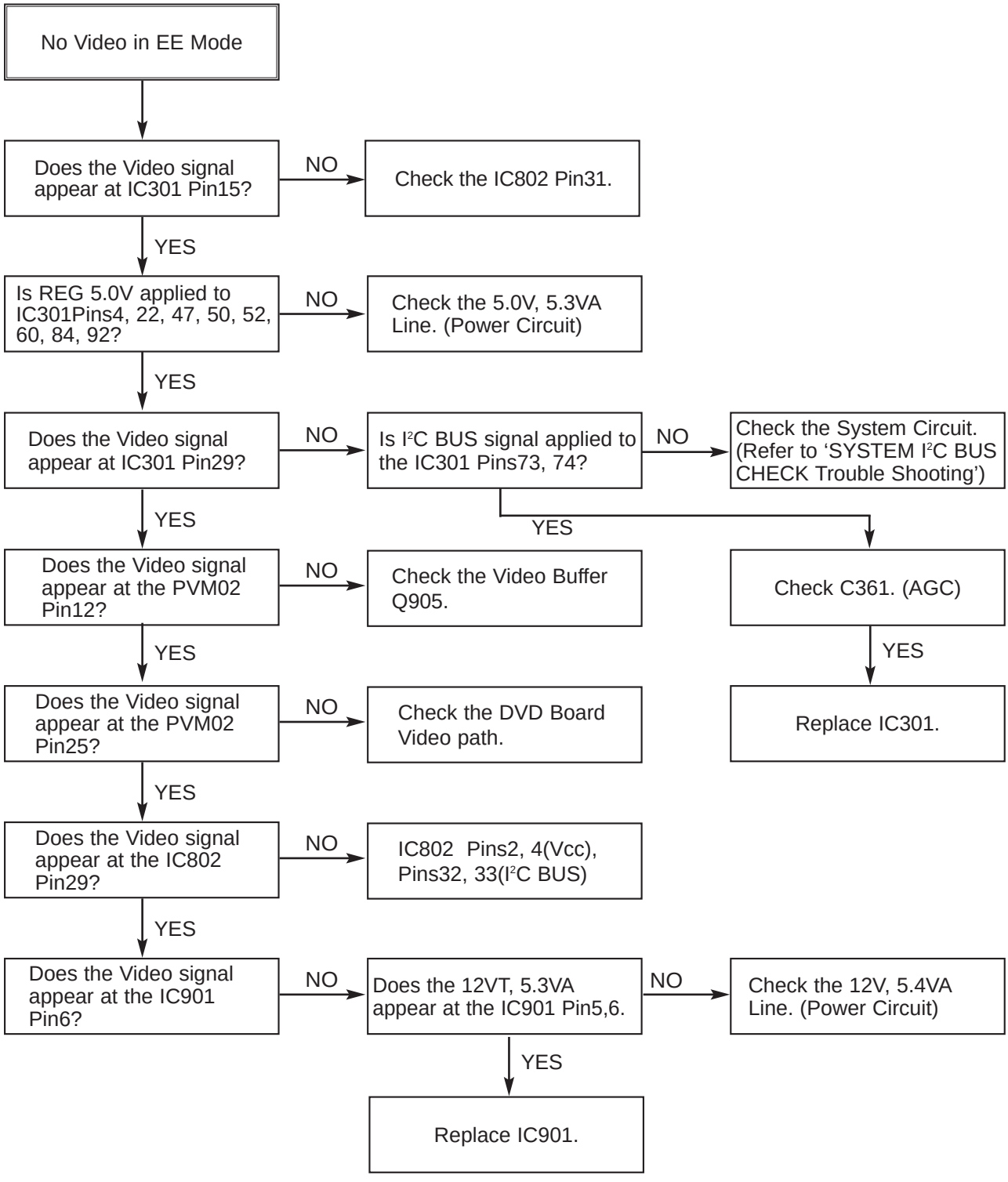
(4) Keys do not work



VCR ELECTRICAL TROUBLESHOOTING GUIDE

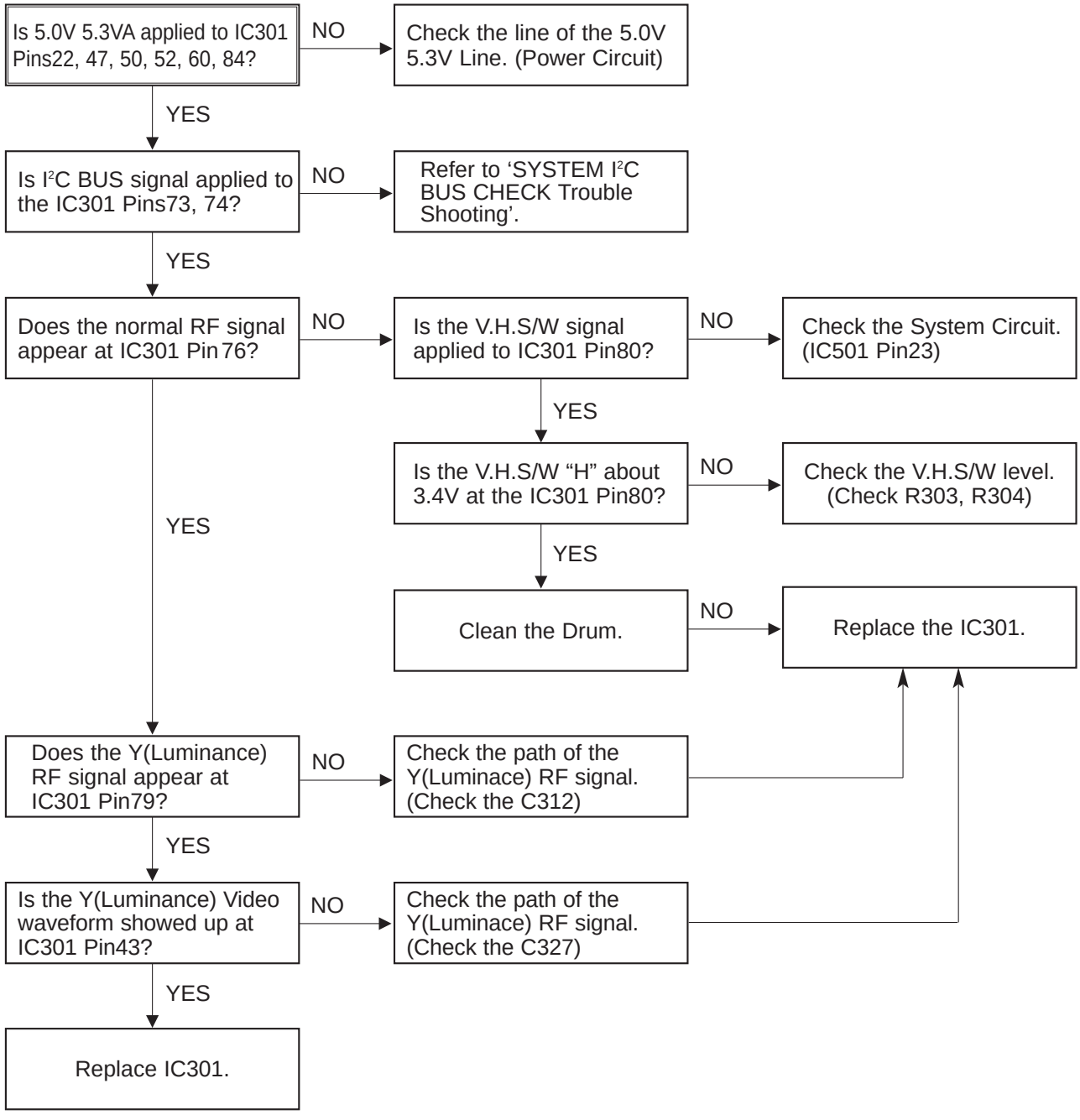
4. Y/C CIRCUIT

(1) No Video in EE Mode,



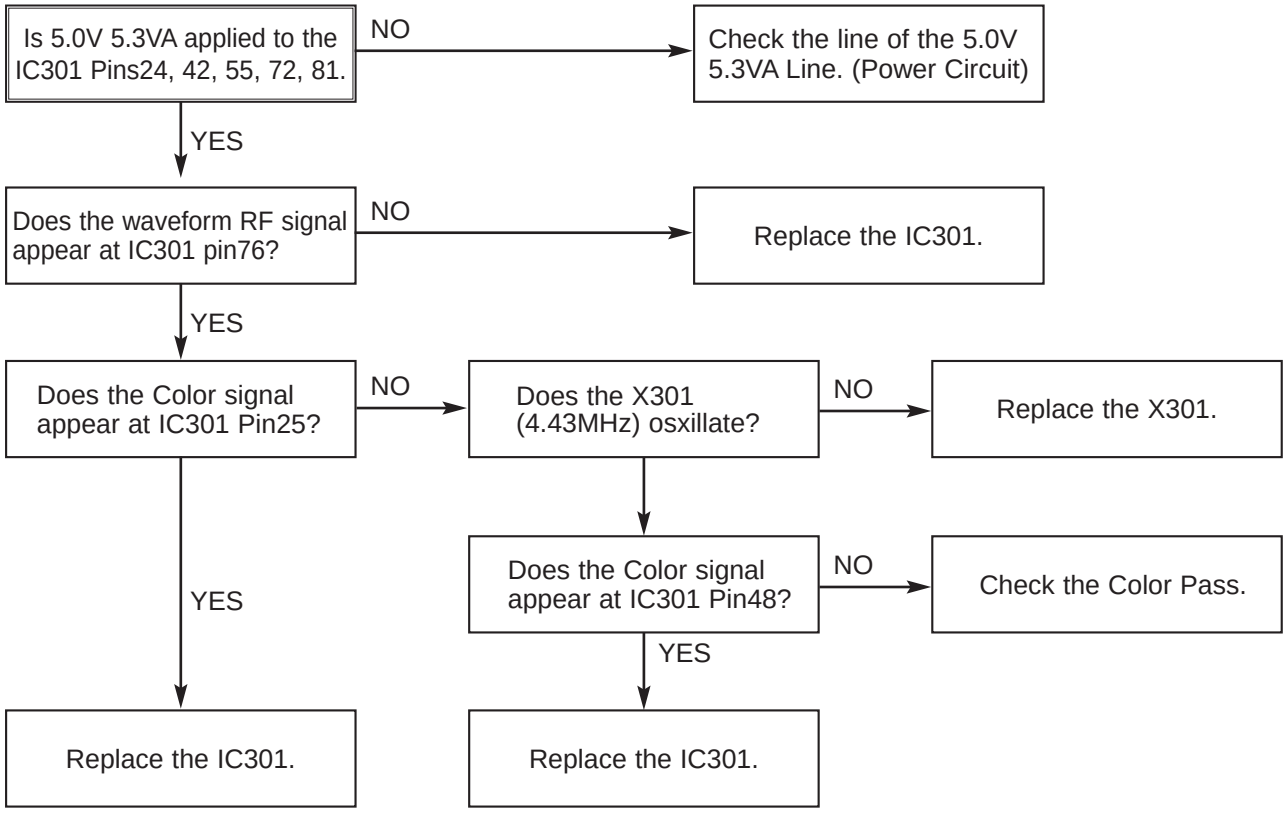
VCR ELECTRICAL TROUBLESHOOTING GUIDE

(2) When the Y(Luminance) signal doesn't appear on the screen in PB Mode,



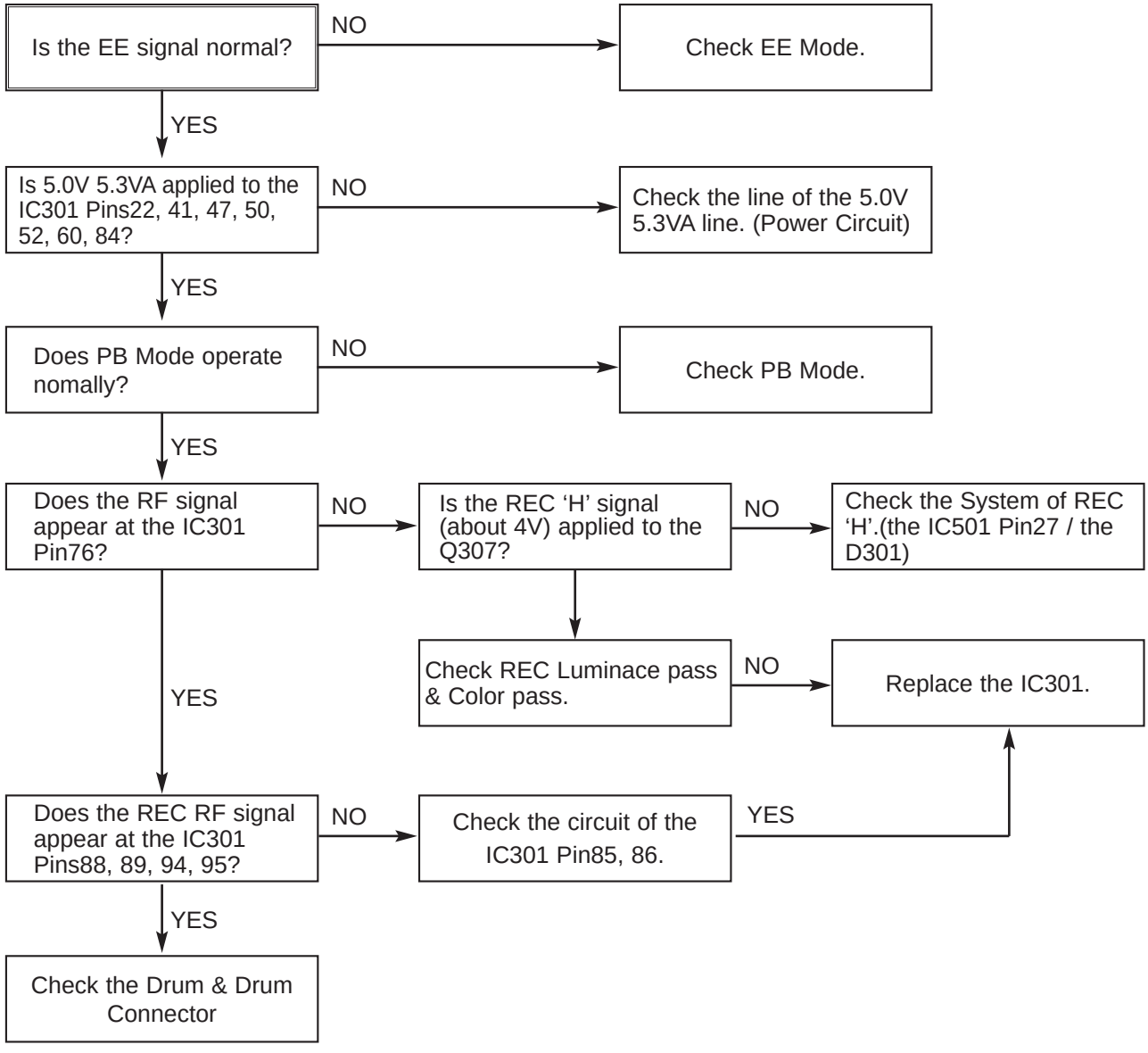
VCR ELECTRICAL TROUBLESHOOTING GUIDE

(3) When the C(Color) signal doesn't appear on the screen in PB Mode,



VCR ELECTRICAL TROUBLESHOOTING GUIDE

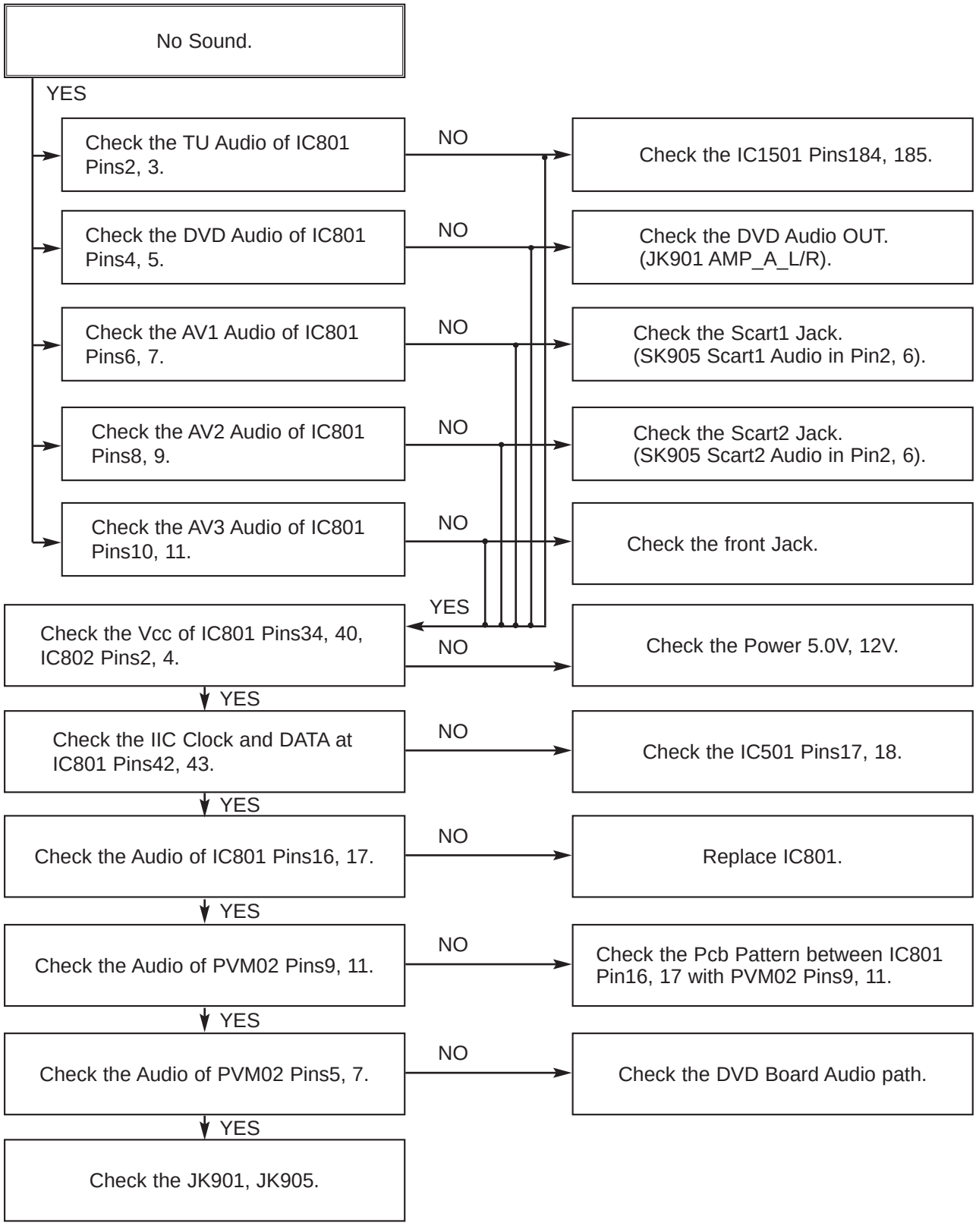
(4) When the Video signal doesn't appear on the screen in REC Mode,



VCR ELECTRICAL TROUBLESHOOTING GUIDE

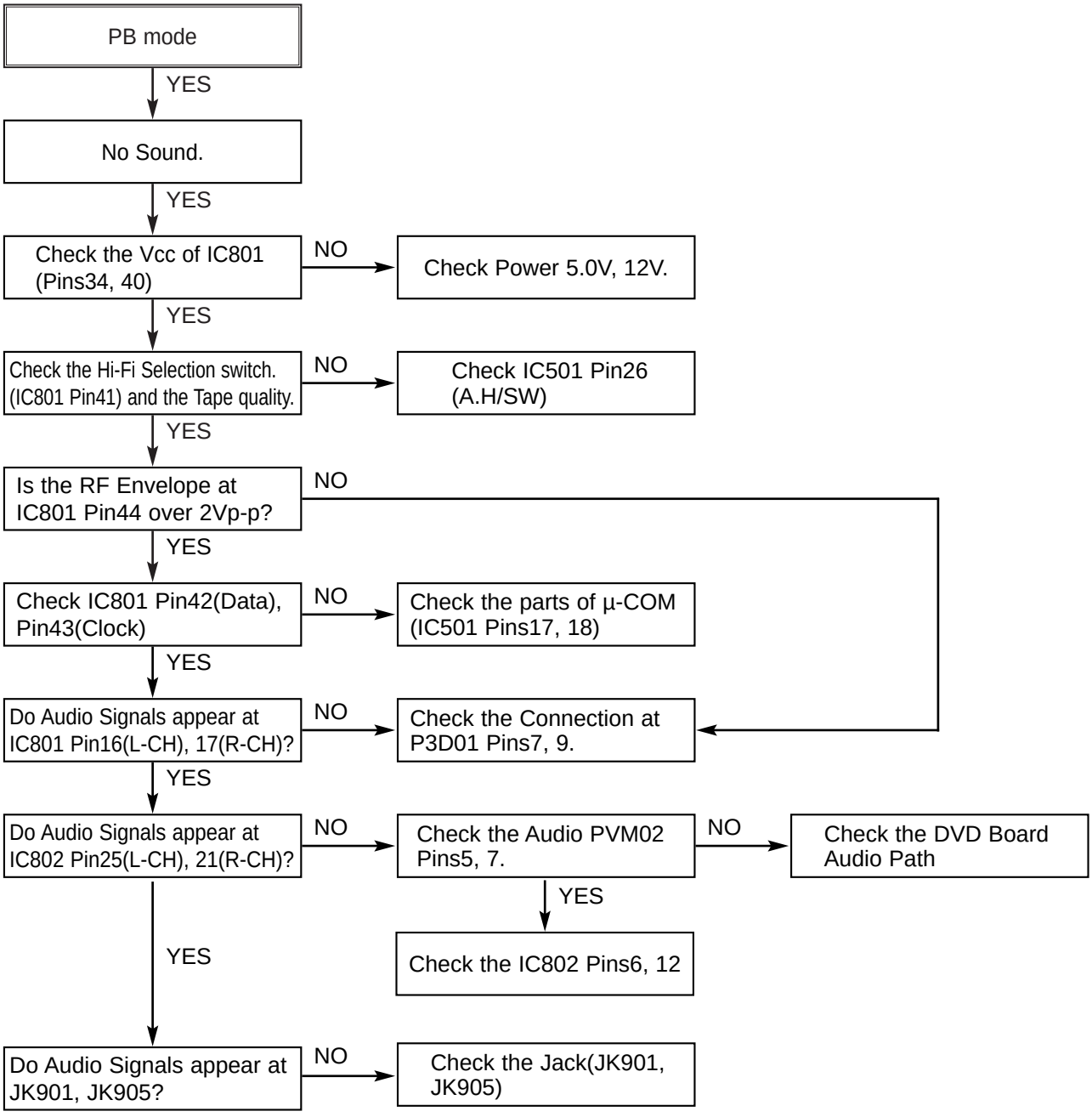
5. Hi-Fi CIRCUIT

(1) No Sound(EE Mode)



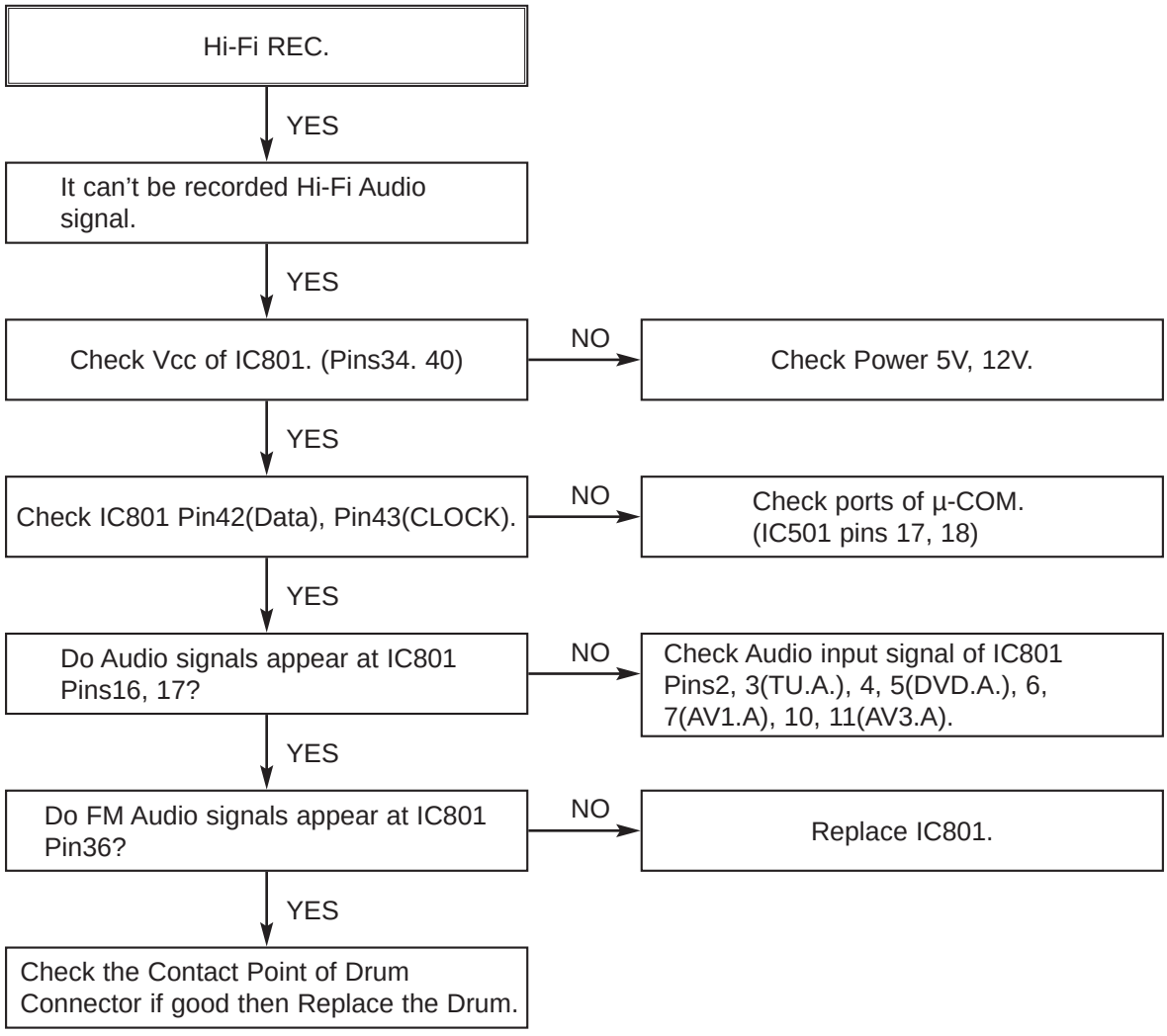
VCR ELECTRICAL TROUBLESHOOTING GUIDE

(2) Hi-Fi Playback



VCR ELECTRICAL TROUBLESHOOTING GUIDE

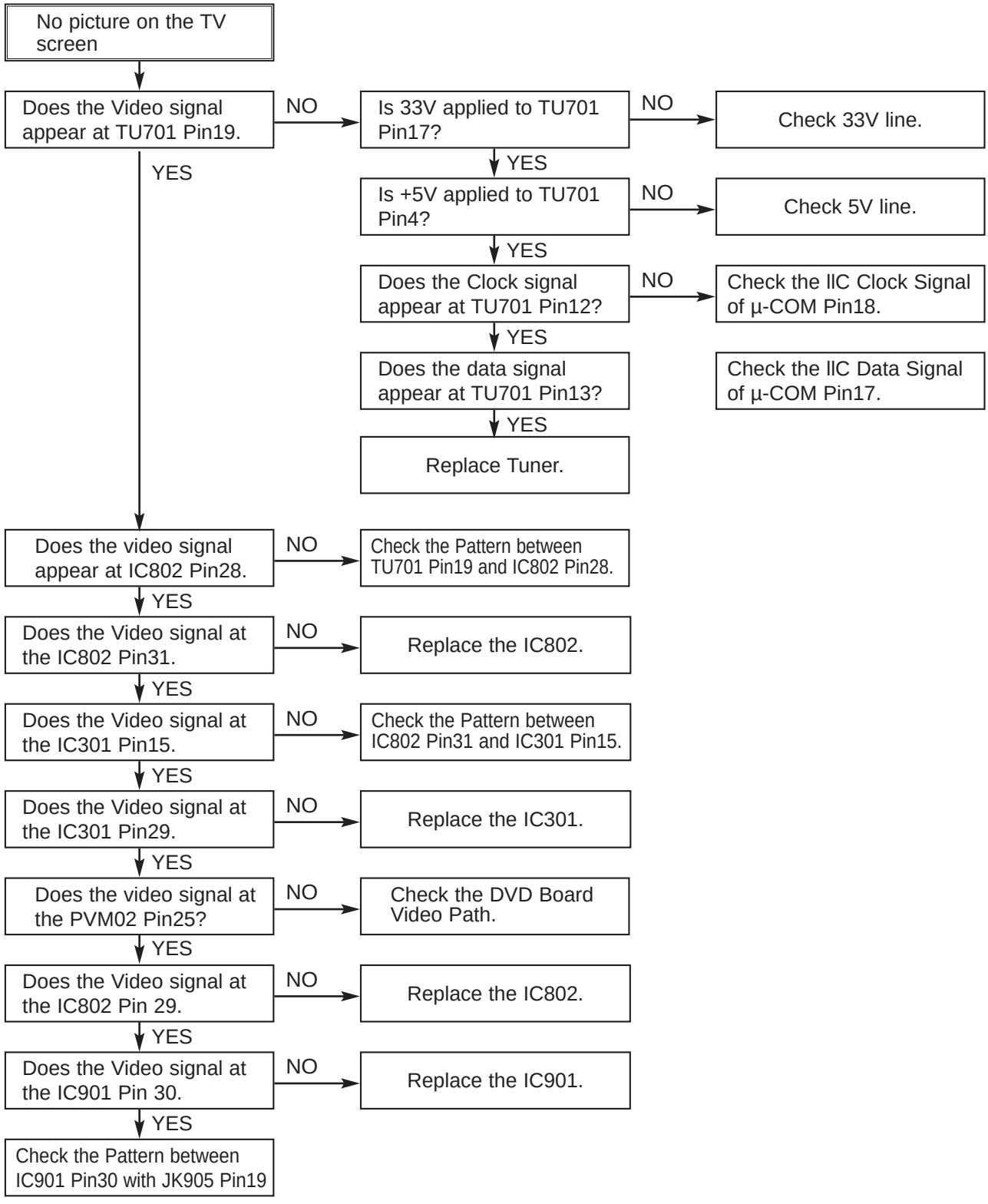
(3)



VCR ELECTRICAL TROUBLESHOOTING GUIDE

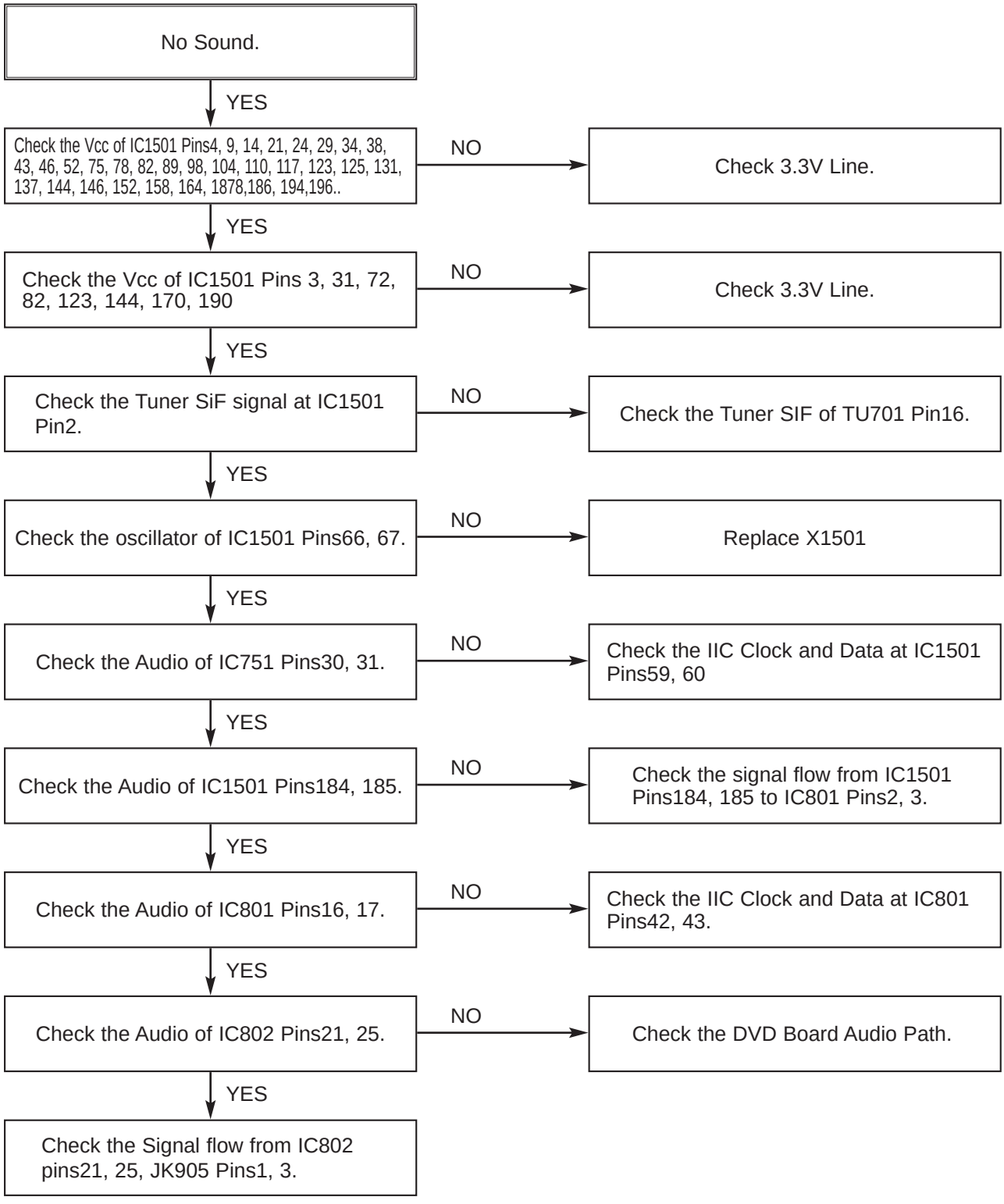
6. Tuner/IF CIRCUIT

(1) No Picture on the TV screen



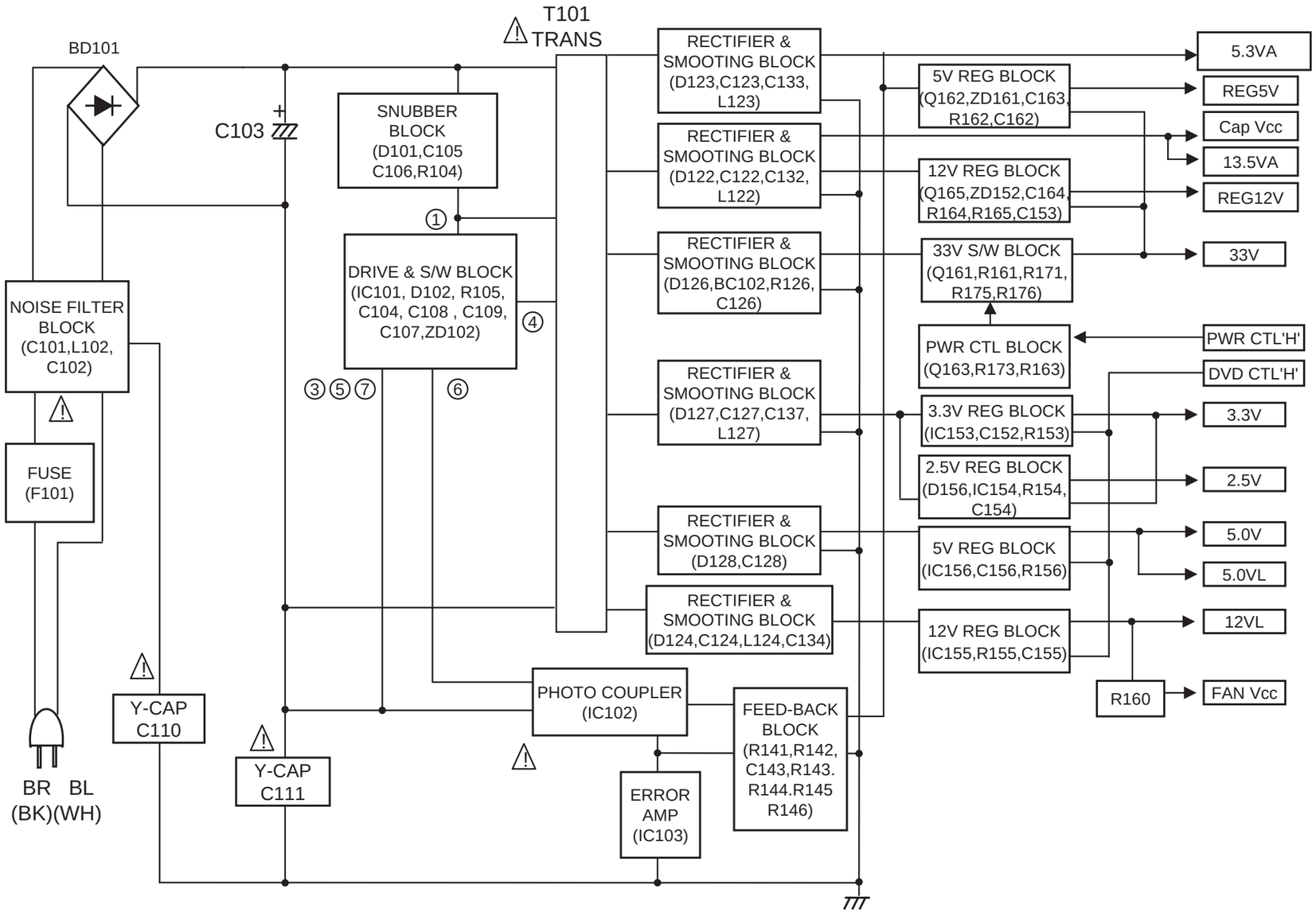
VCR ELECTRICAL TROUBLESHOOTING GUIDE

(B) No Sound

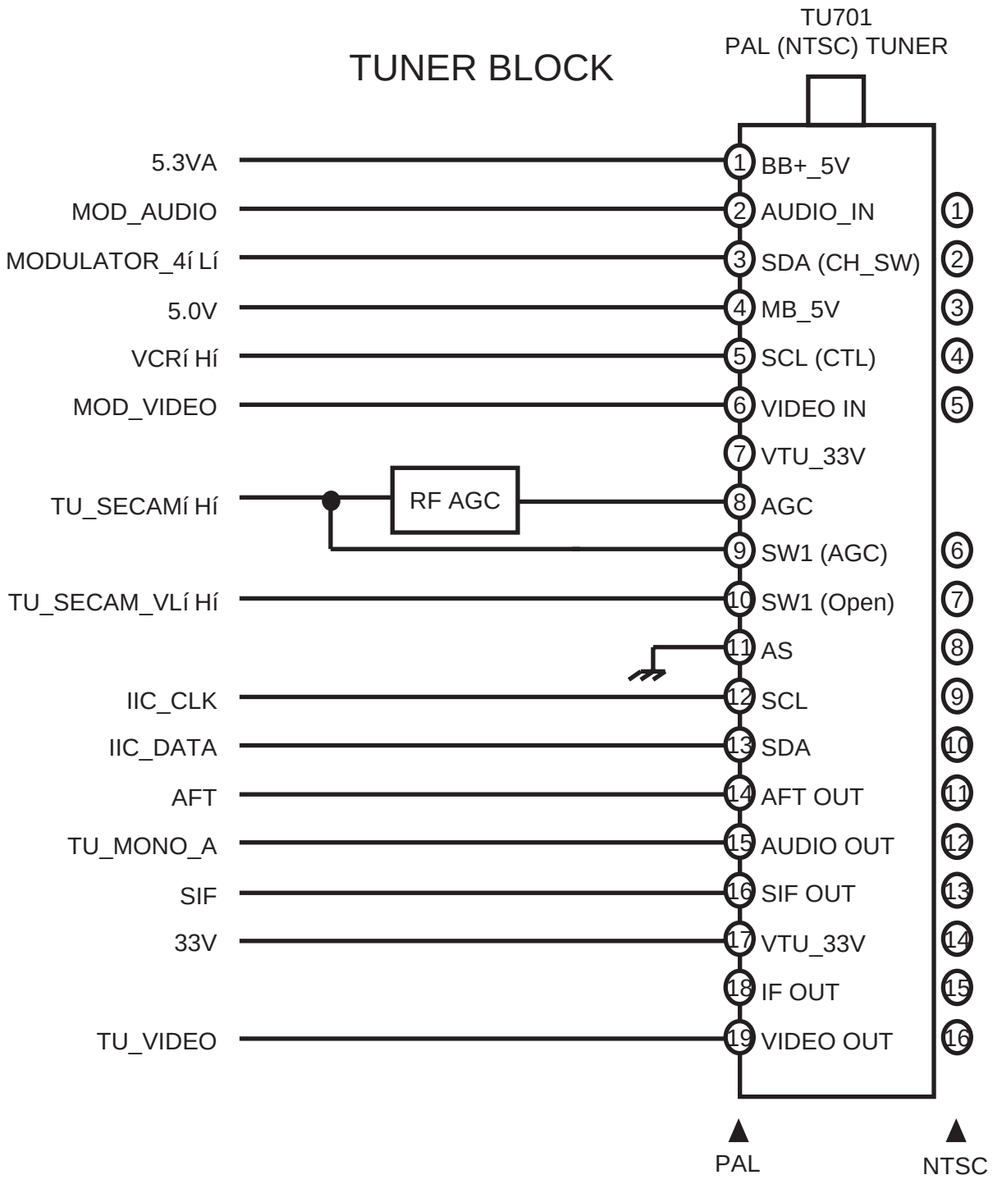


BLOCK DIAGRAMS

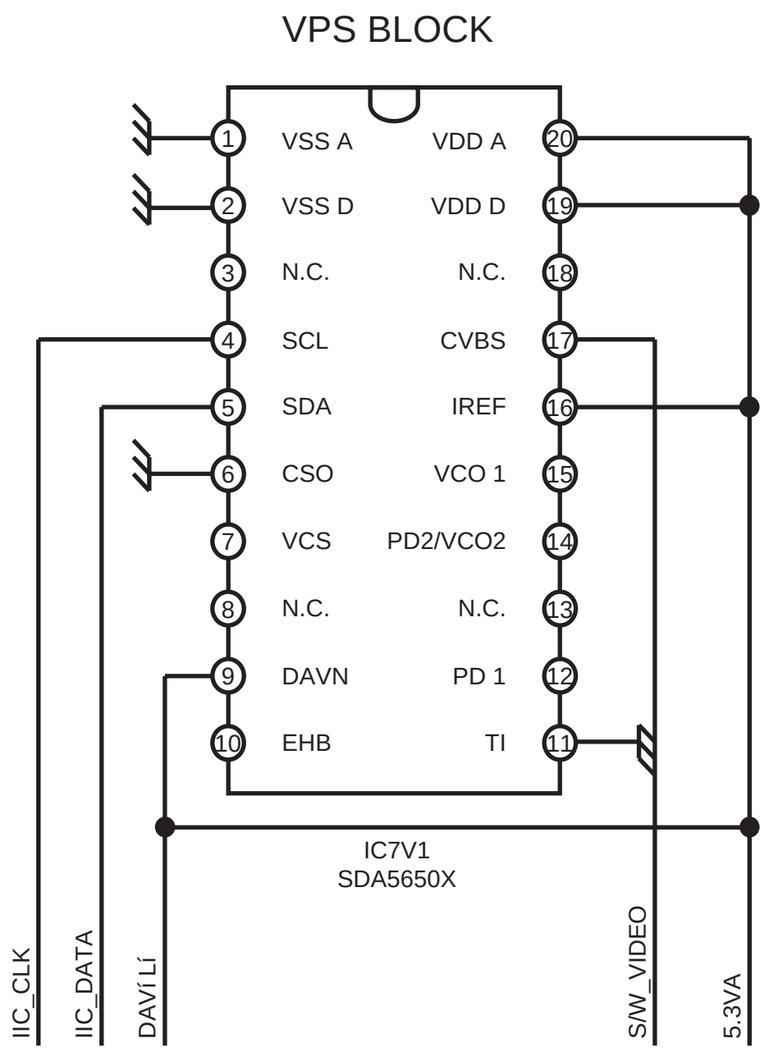
1. POWER(SMPS) BLOCK DIAGRAM



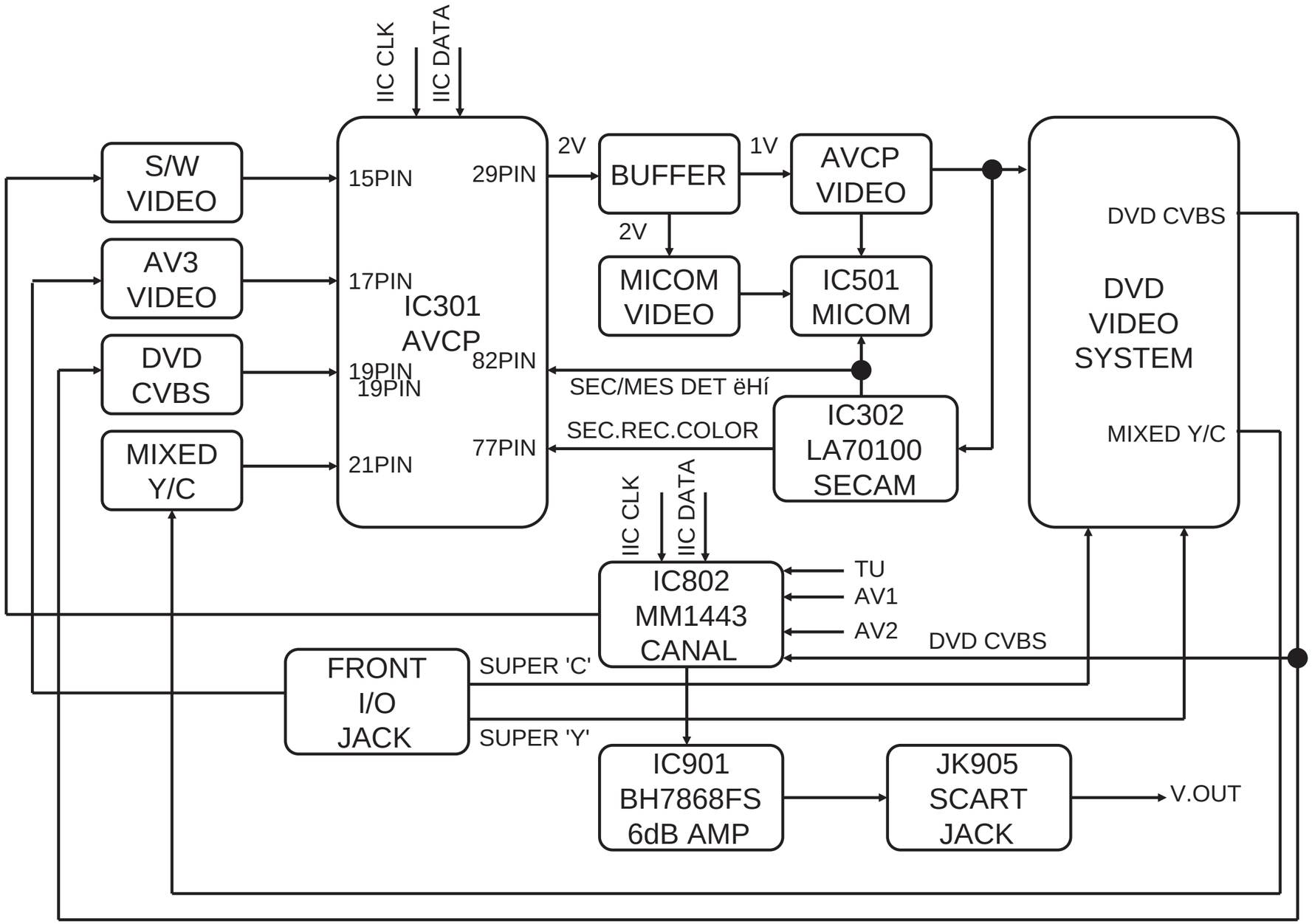
2. TU/IF BLOCK DIAGRAM



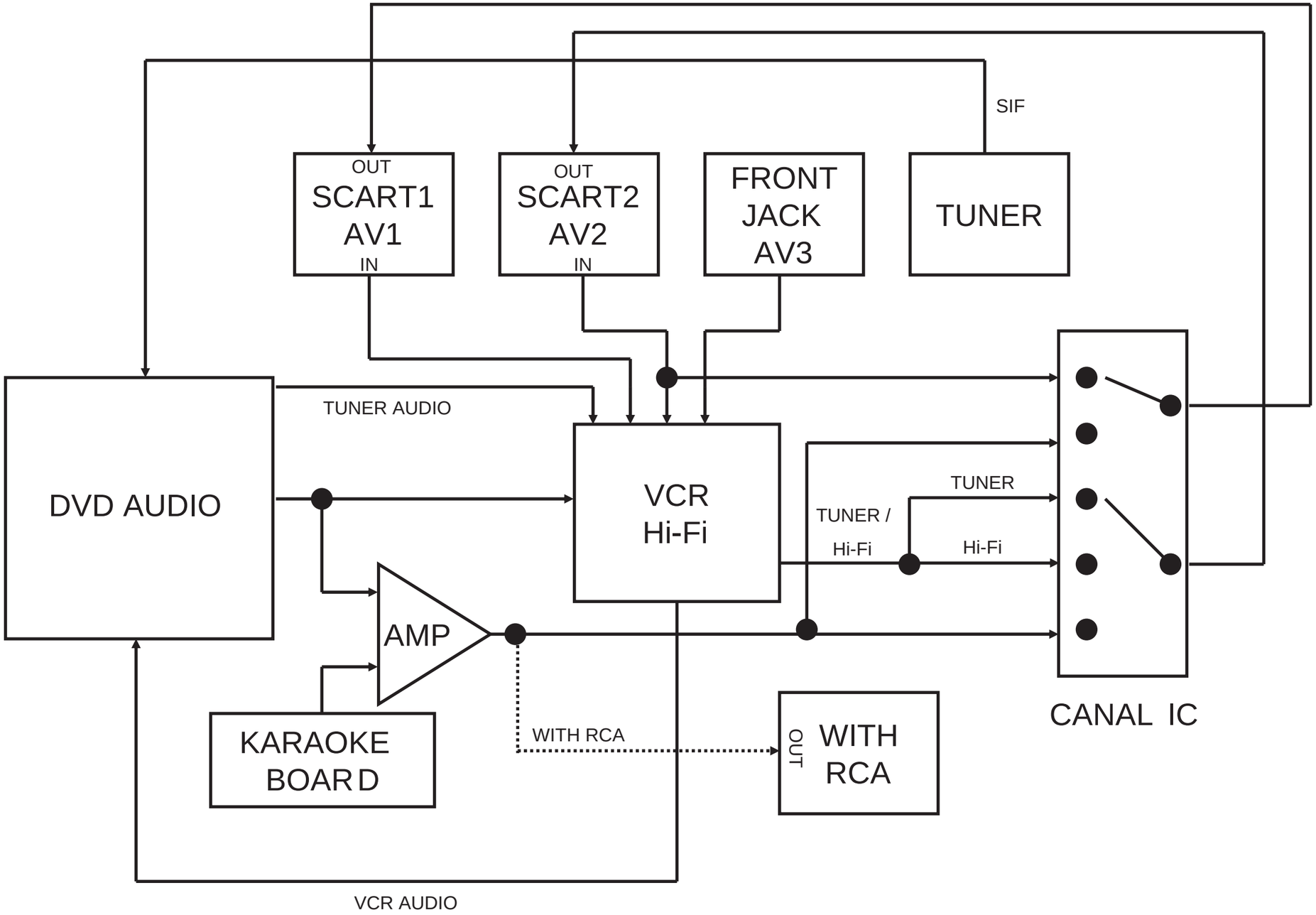
3. VPS BLOCK DIAGRAM



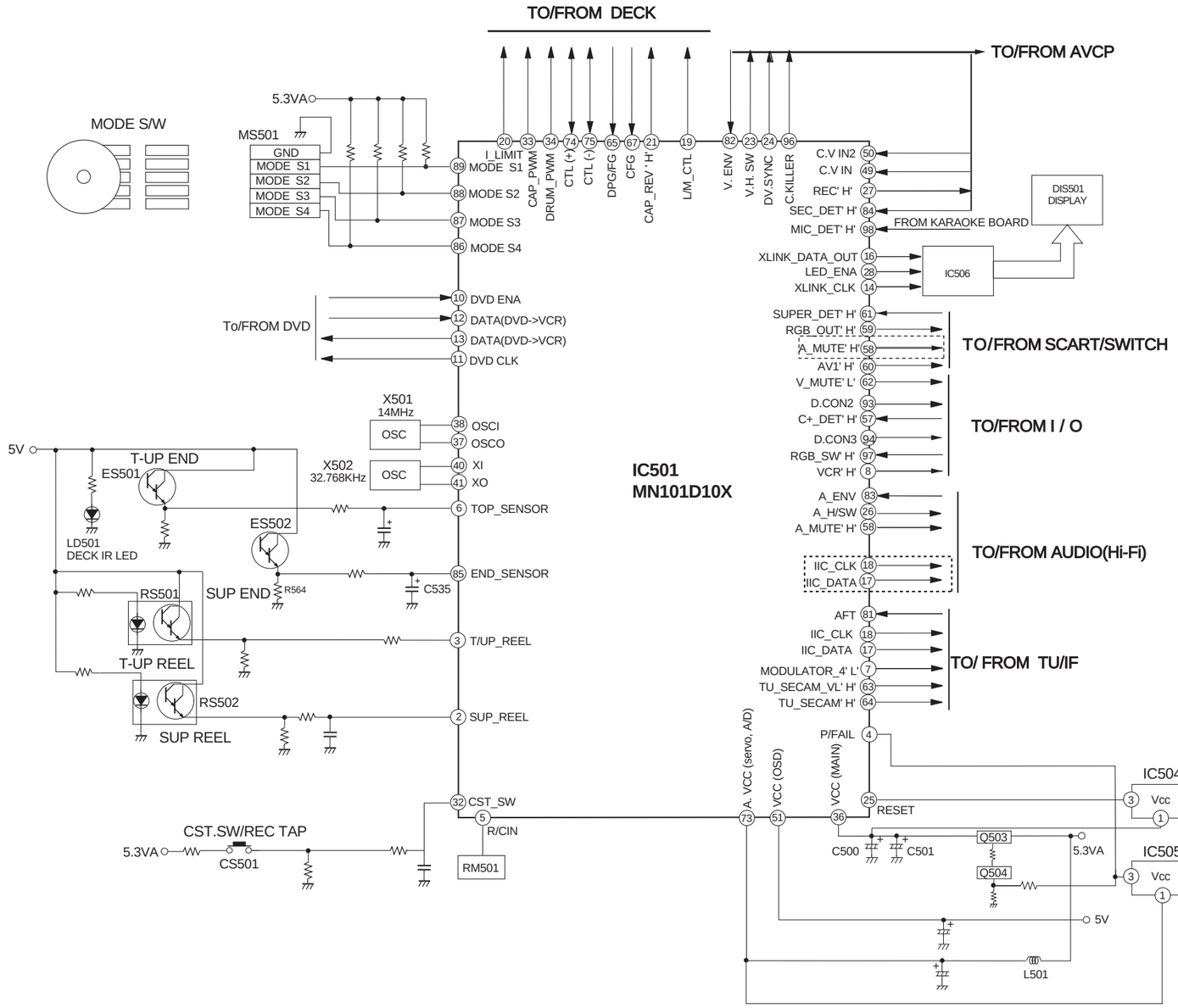
4. Y/C BLOCK DIAGRAM



5. Hi-Fi BLOCK DIAGRAM

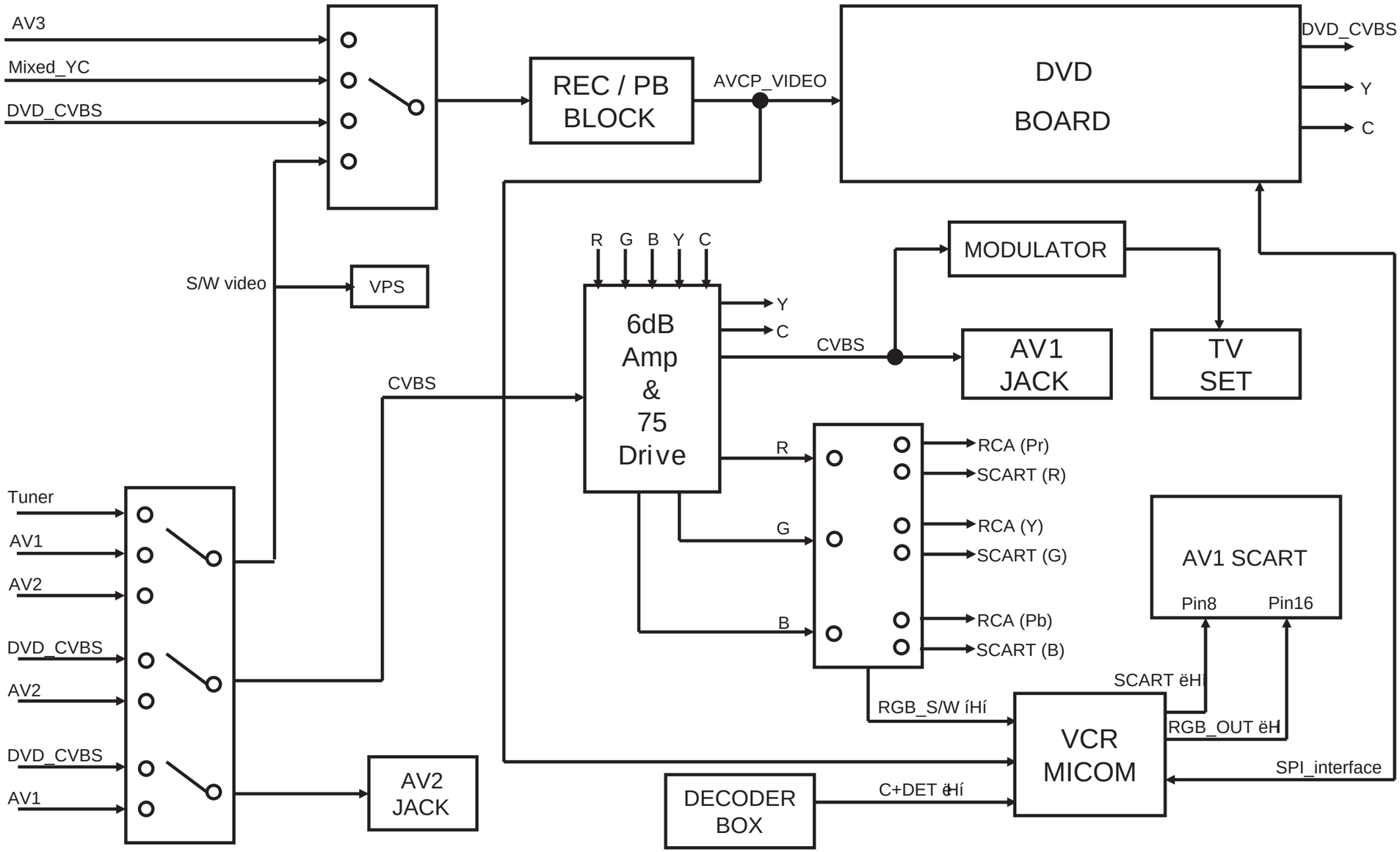


6. SYSTEM BLOCK DIAGRAM



VCR+DVD REC SCART+RCA

7. SCART & SWICH BLOCK DIAGRAM



CIRCUIT DIAGRAMS

1. POWER(SMPS) CIRCUIT DIAGRAM

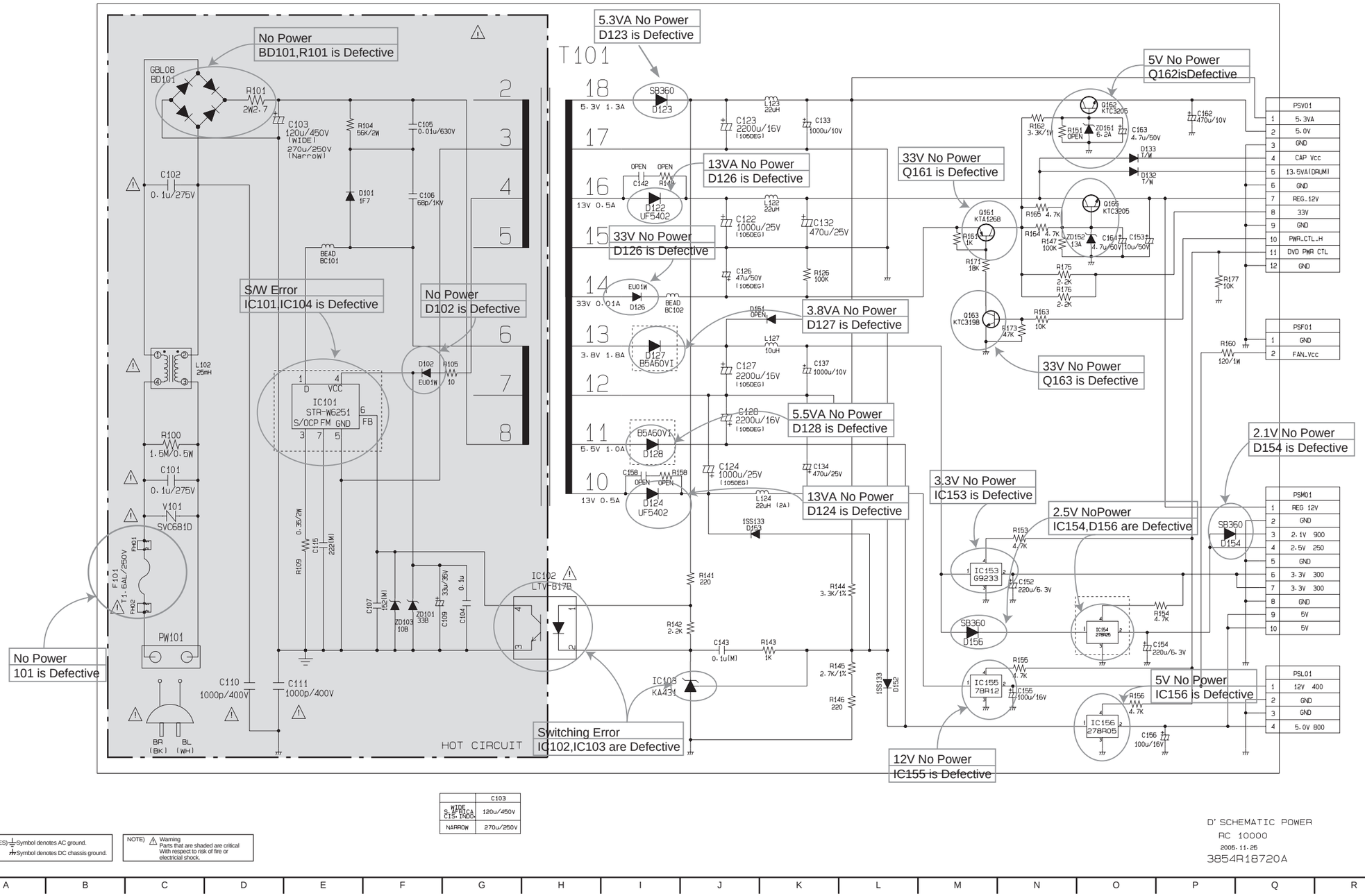
IMPORTANT SAFETY NOTICE

WHEN SERVICING THIS CHASSIS, UNDER NO CIRCUMSTANCES SHOULD THE ORIGINAL DESIGN BE MODIFIED OR ALTERED WITHOUT PERMISSION FROM THE LG ELECTRONICS CORPORATION. ALL COMPONENTS SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL CIRCUIT. SPECIAL COMPONENTS ARE SHADED ON THE SCHEMATIC FOR EASY IDENTIFICATION.

THIS CIRCUIT DIAGRAM MAY OCCASIONALLY DIFFER FROM THE ACTUAL CIRCUIT USED. THIS WAY, IMPLEMENTATION OF THE LATEST SAFETY AND PERFORMANCE IMPROVEMENT CHANGES INTO THE SET IS NOT DELAYED UNTIL THE NEW SERVICE LITERATURE IS PRINTED.

NOTE :

1. Shaded(■) parts are critical for safety. Replace only with specified part number.
2. Voltages are DC-measured with a digital voltmeter during Play mode.

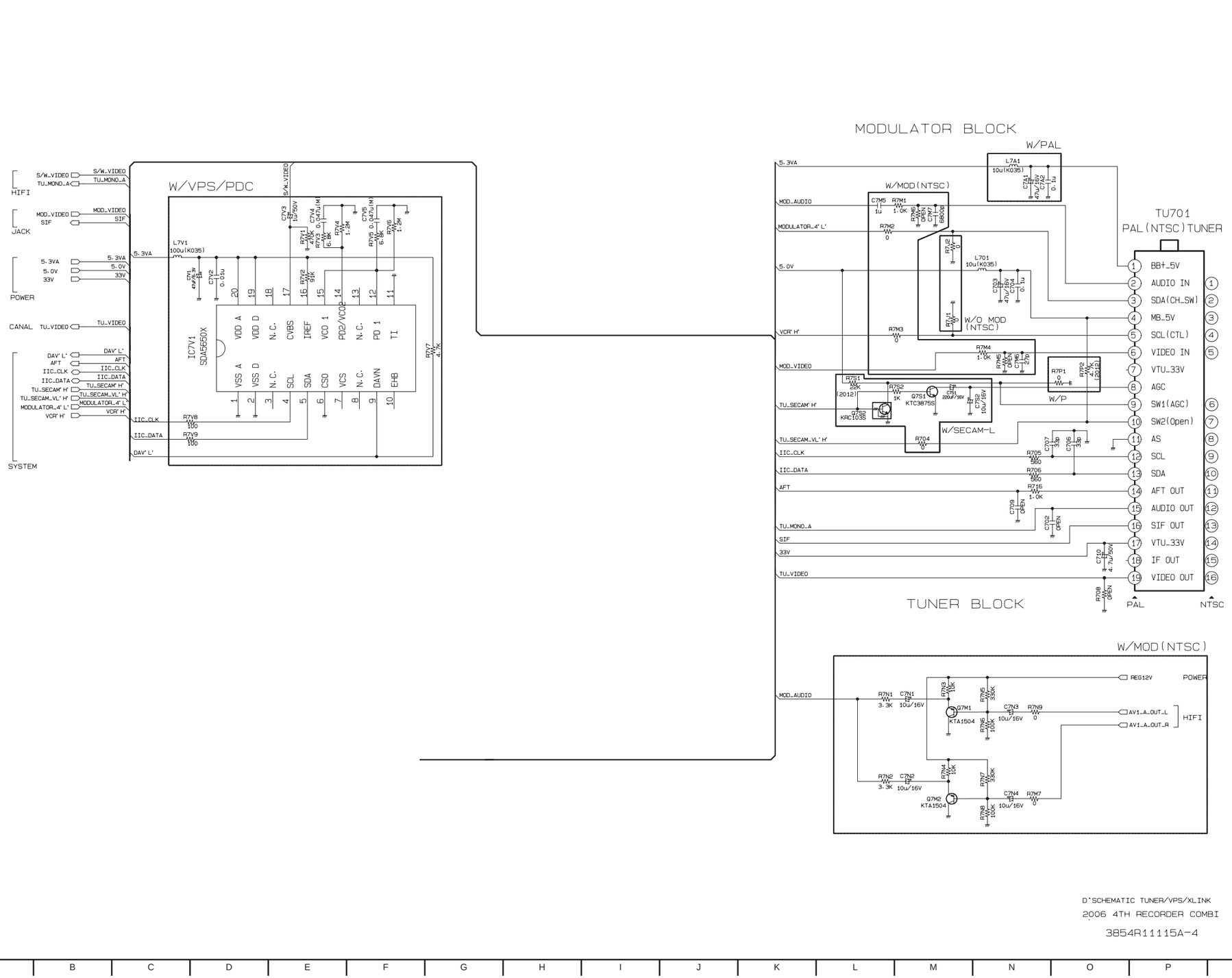


	C103
WIDE S.AMERICA CIS, INDO	120u/450V
NARROW	270u/250V

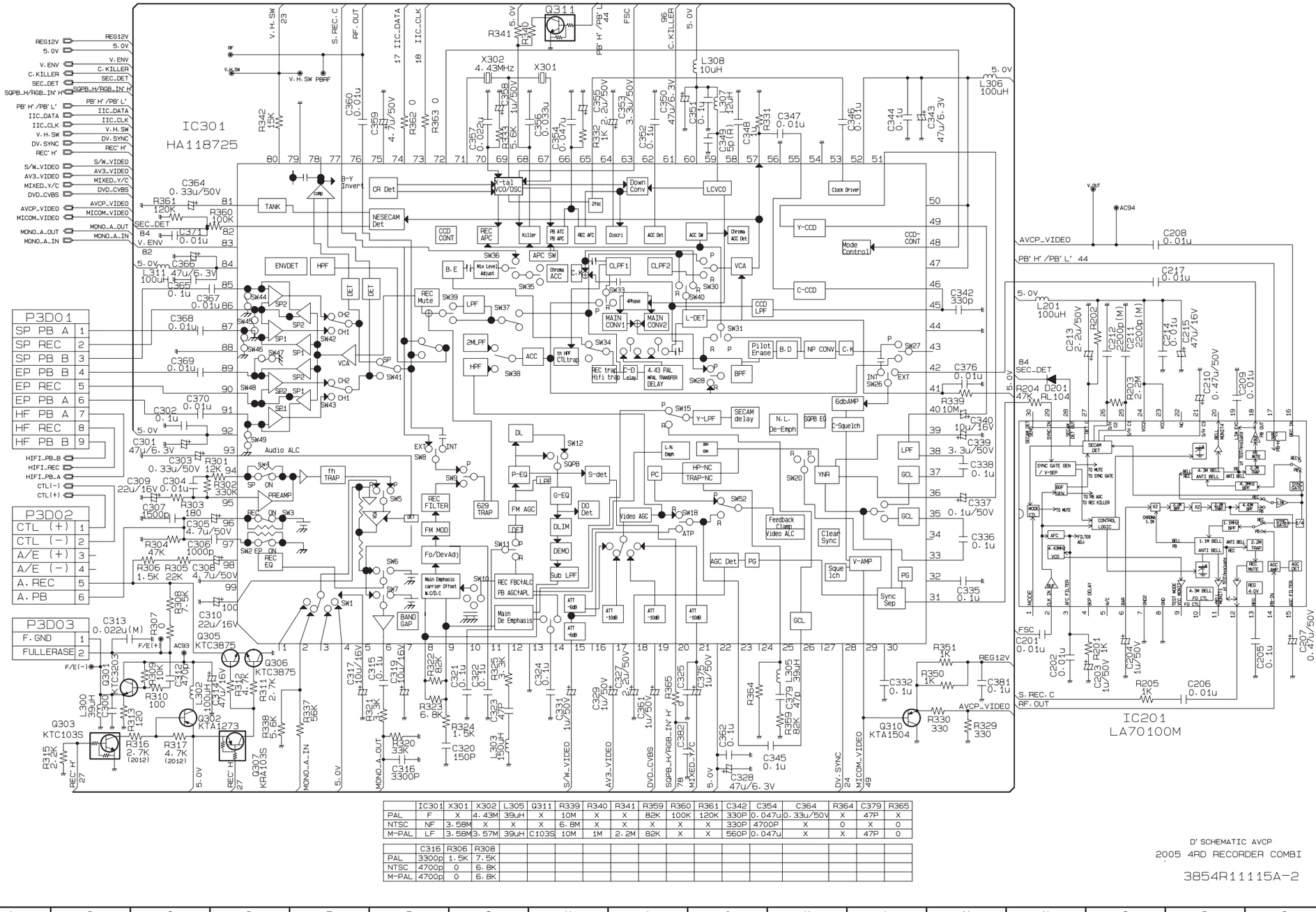
NOTES) ⏚ Symbol denotes AC ground.
⏚ Symbol denotes DC chassis ground.

NOTE) ⚠ Warning
Parts that are shaded are critical With respect to risk of fire or electrical shock.

2. TUNER CIRCUIT DIAGRAM



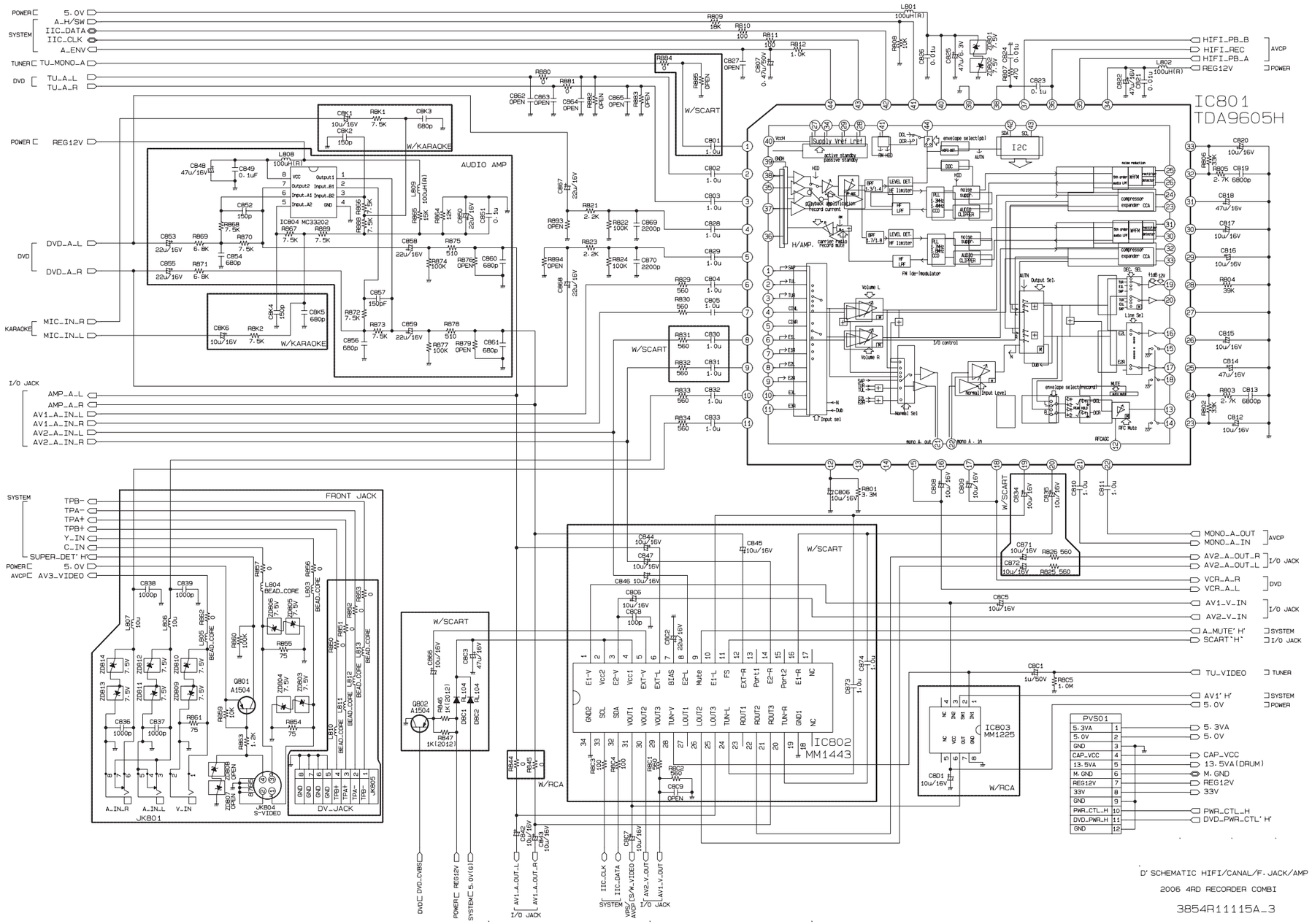
3. A/V CIRCUIT DIAGRAM



	IC301	X301	X302	L305	Q311	R339	R340	R341	R359	R360	R361	C342	C354	C364	R364	C379	R365
PAL	F	X	4.43M	39uH	X	10M	X	X	82K	100K	120K	330P	0.047u	0.33u/50V	X	47P	X
NTSC	NF	3.58M	X	X	X	6.8M	X	X	X	X	X	330P	4700P	X	0	X	0
M-PAL	LF	3.58M	3.57M	39uH	C103S	10M	1M	2.2M	82K	X	X	560P	0.047u	X	X	47P	0

	C316	R306	R308
PAL	3300p	1.5K	7.5K
NTSC	4700p	0	6.8K
M-PAL	4700p	0	6.8K

4. Hi-Fi CIRCUIT DIAGRAM

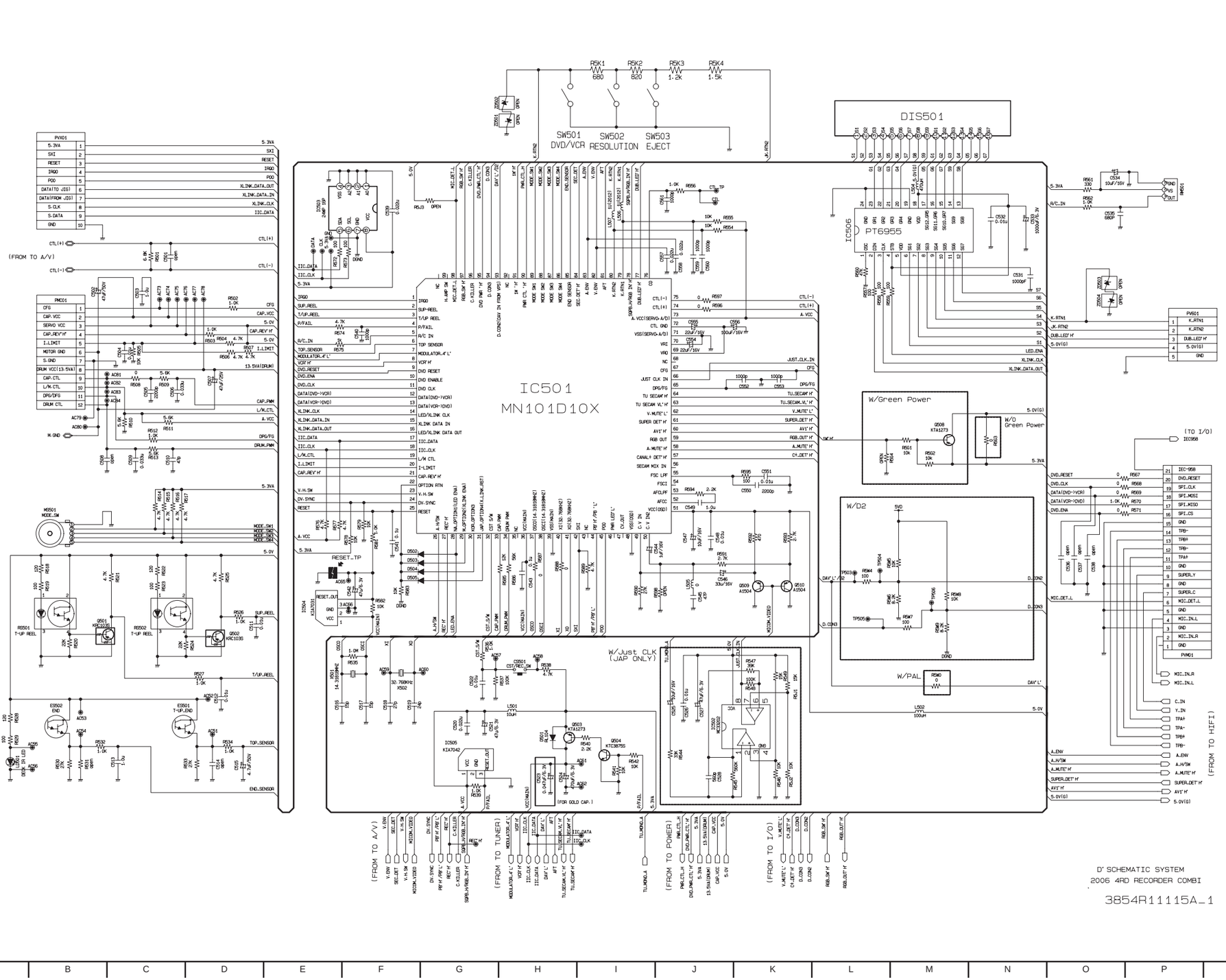


D' SCHEMATIC HIFI/CANAL/F.JACK/AMP

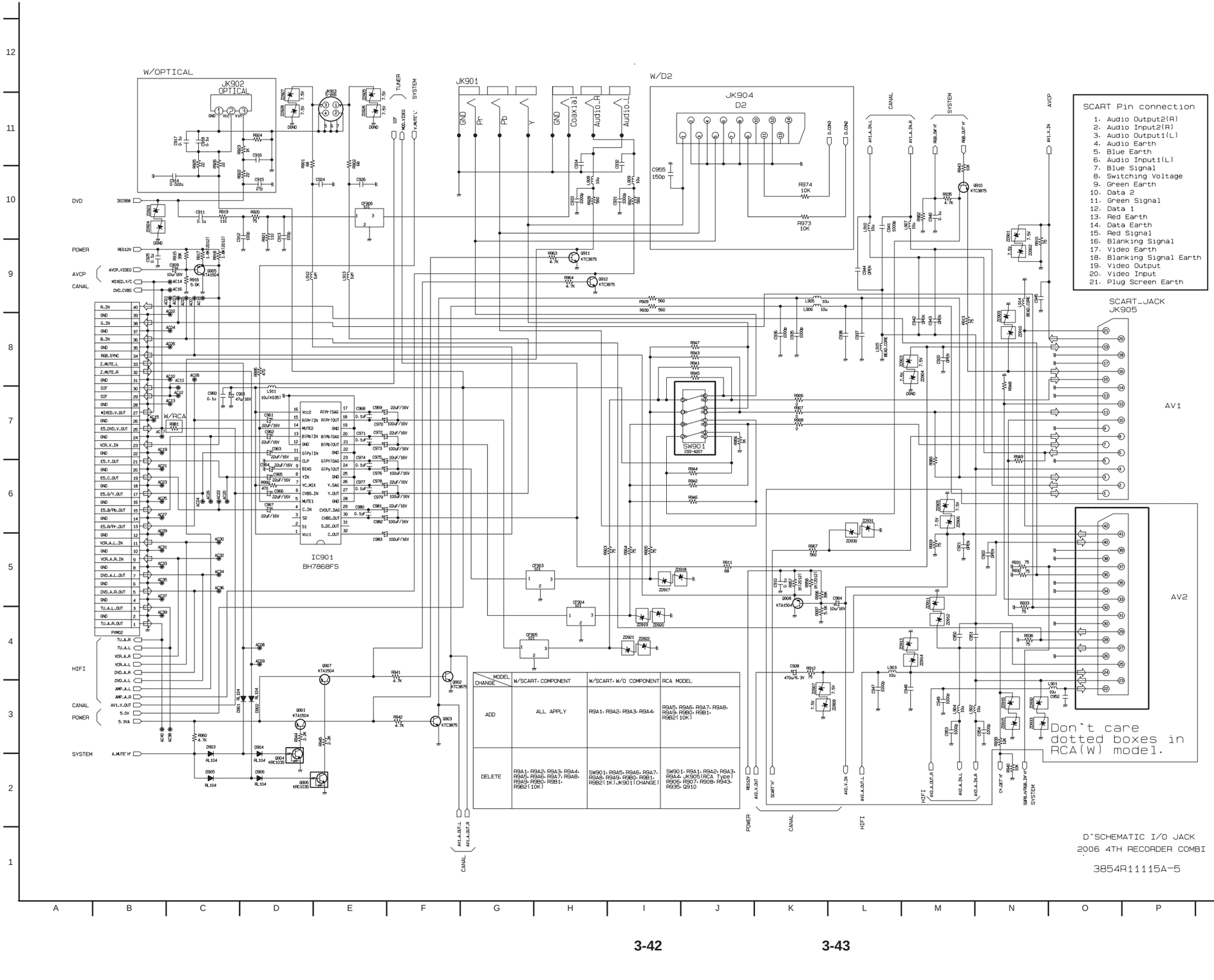
2006 4RD RECORDER COMBI

3854R11115A_3

5. SYSTEM CIRCUIT DIAGRAM

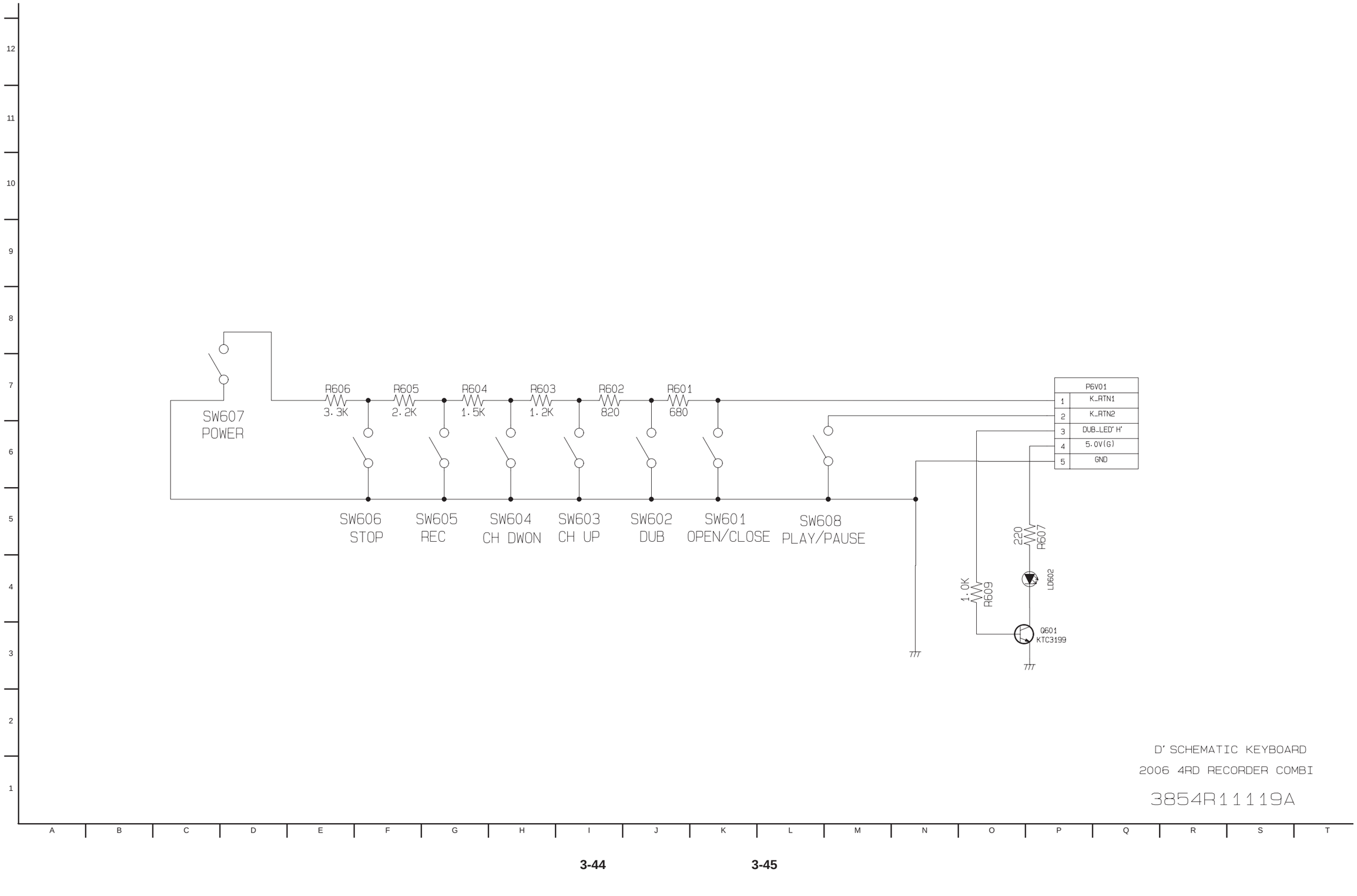


6. SCART CIRCUIT DIAGRAM (SCART MODEL ONLY)

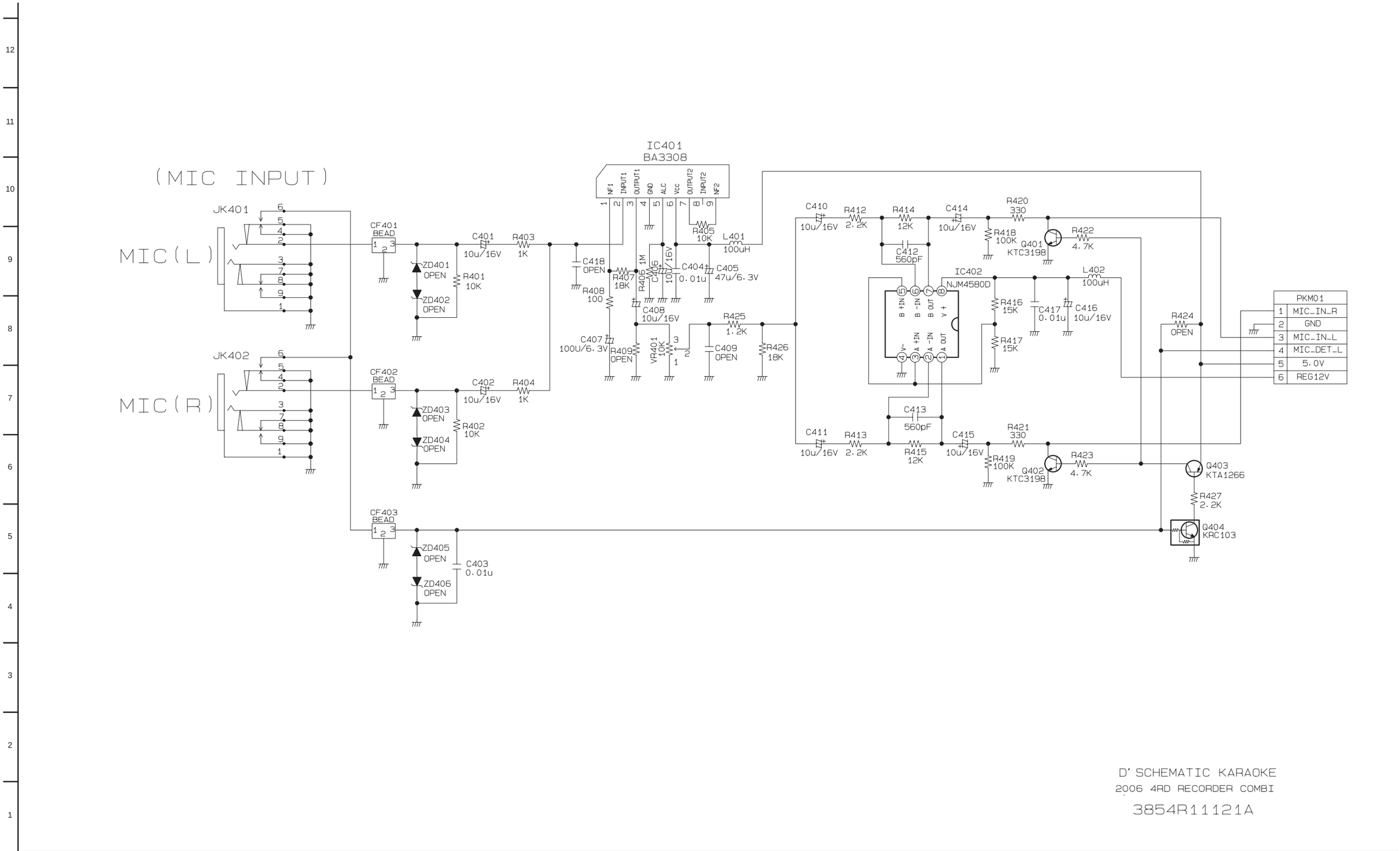


MODEL / CHANGE	W/SCART. COMPONENT	W/SCART. W/O COMPONENT	RCA MODEL
ADD	ALL APPLY	R9A1, R9A2, R9A3, R9A4,	R9A5, R9A6, R9A7, R9A8, R9A9, R9B0, R9B1, R9B2(10K)
DELETE	R9A1, R9A2, R9A3, R9A4, R9A5, R9A6, R9A7, R9A8, R9A9, R9B0, R9B1, R9B2(10K)	SW901, R9A5, R9A6, R9A7, R9A8, R9A9, R9B0, R9B1, R9B2(1K), JK901(CHANGE)	SW901, R9A1, R9A2, R9A3, R9A4, JK905(RCA Type), R906, R907, R908, R943, R935, Q910

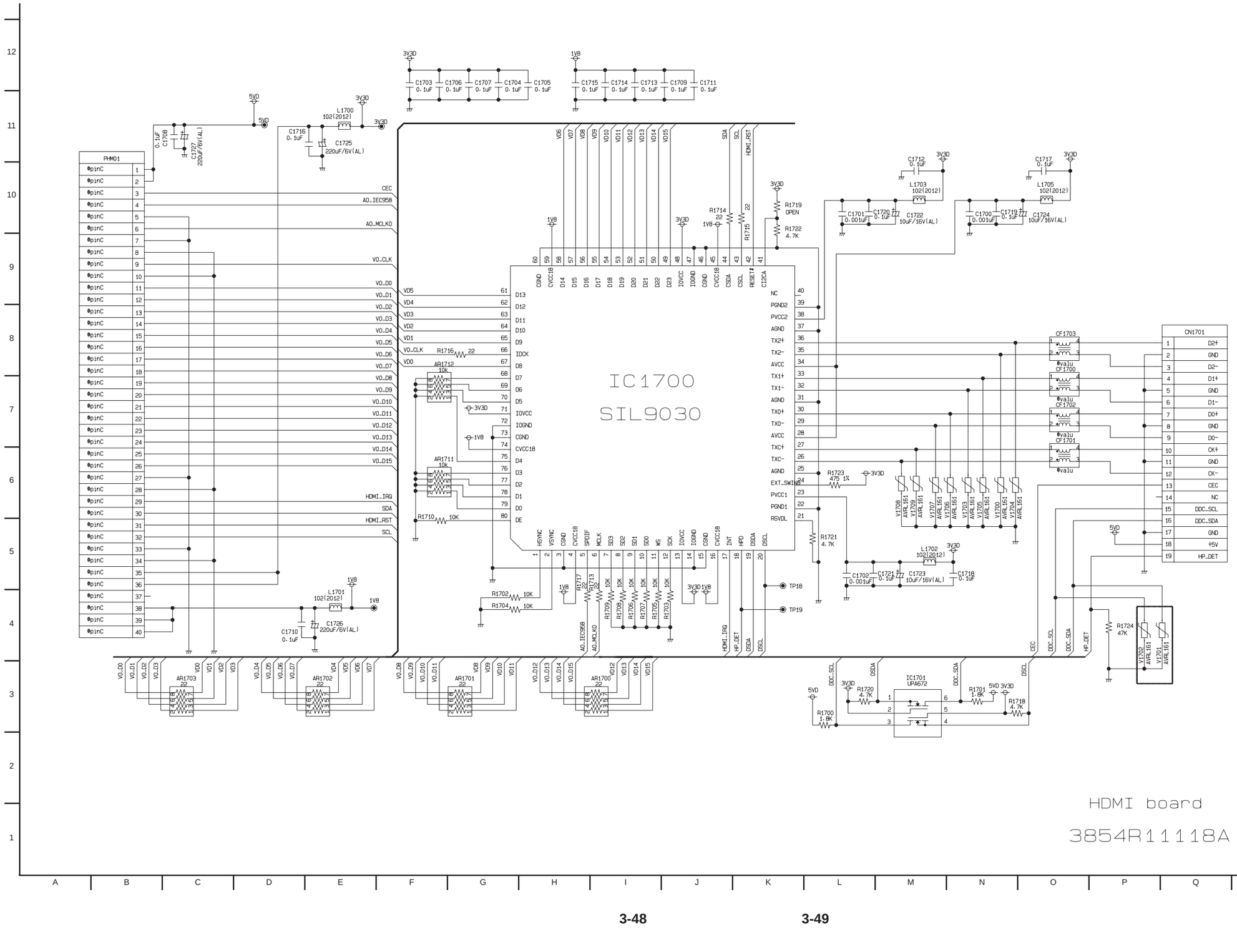
7. KEY CIRCUIT DIAGRAM



8. KARAOKE CIRCUIT IAGRAM (KARAOKE MODEL ONLY)

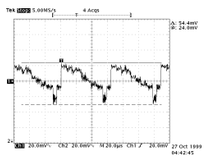


9. HDMI CIRCUIT DIAGRAM(HDMI MODEL ONLY)

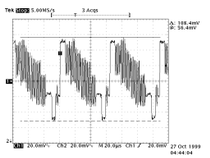


WAVEFORMS

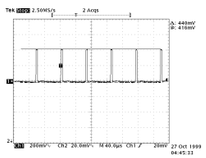
✦ IC301 Oscilloscope Waveform

① 

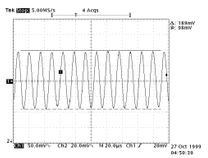
IC301 Pins 8, 9
PB mode
500mvp-p

② 

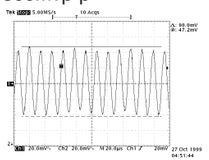
IC301 Pins 15, 17, 19, 21
Video in 1Vp-p

③ 

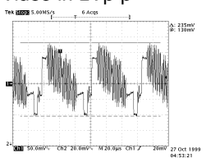
IC301 Pin 31
PB/REC mode
4.0Vp-p

④ 

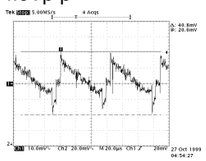
IC301 Pin 98
REC mode
1.1Vp-p

⑤ 

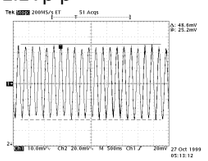
IC301 Pin 94
REC mode
2.0Vp-p

⑥ 

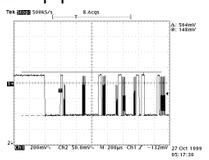
IC301 Pin 29
PB mode
2.02Vp-p

⑦ 

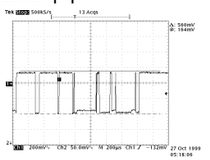
IC301 Pin 57
PB mode
400mVp-p

⑧ 

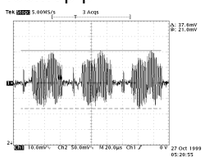
IC301 Pin 63
PB mode
400mVp-p

⑨ 

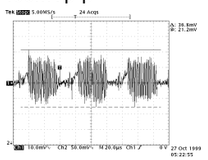
IC301 Pin 73
PB/REC mode
5Vp-p

⑩ 

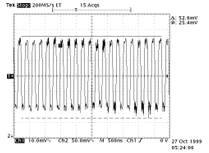
IC301 Pin 74
PB/REC mode
5Vp-p

⑪ 

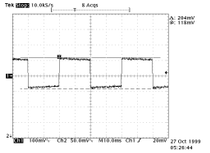
IC301 Pin 77
REC mode
340mVp-p

⑫ 

IC301 Pin 42
PB mode
300mVp-p

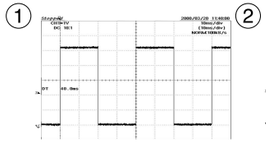
⑬ 

IC301 Pin 53
PB mode
400mVp-p

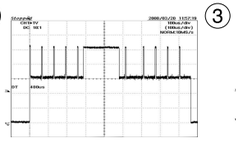
⑭ 

IC301 Pin 80
PB mode
3.6Vp-p

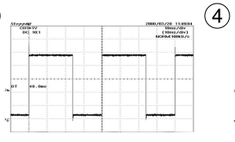
✦ IC501 Waveform Photographs

① 

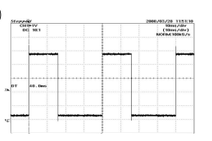
V.HSW
(IC501 Pin 23)
1V/10mS
REC/PB MODE

② 

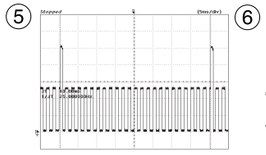
DV.SYNC
(IC501 PIN 24)
1V/100uS
QUE/REV MODE

③ 

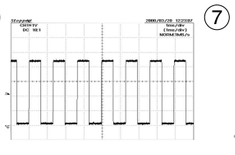
CTL(+)
(IC501 Pin 74)
1V/10mS

④ 

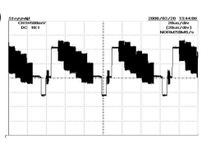
CTL(-)
(IC501 Pin 75)
1V/10mS

⑤ 

DFG/DFG
(IC501 PIN 65)
1V/10mS
REC/PB MODE

⑥ 

CFG
(IC501 Pin 67)
1V/10mS

⑦ 

V.IN
(IC501 Pin 49)
500mV/20uS

• CIRCUIT VOLTAGE CHART

MODE / PIN NO.	EE	PLAY
IC301		
1	20m	100m
2	20m	100m
3	20m	100m
4	1.95V	4.88V
5	1.94V	1.88V
6	2.6V	3.12V
7	2.8V	2.74V
8	2.5V	1.7V
9	2.04V	1.3V
10	1.8V	1.88V
11	2V	1.8V
12	1.6V	0.72V
13	0V	0V
14	1.26V	1.3V
15	3.04V	3.36V
16	0V	4.78V
17	2.38V	2.32V
18	1.88V	2.84V
19	3.02V	2.94V
20	0V	0V
21	2.38V	2.34V
22	4.88V	4.82V
23	2.64V	2.24V
24	0V	0V
25	2.08V	2.14V
26	3.08V	2.66V
27	0V	0V
28	150m	140m
29	3.88V	3.18V
30	2.08V	2.74V
31	4.74V	4.72m
32	2.08V	2.12V
33	2.42V	2.26V
34	1.58V	1.54V
35	3.3V	3.36V
36	2.5V	2.32V
37	3.1V	3.18V
38	2.6V	2.28V
39	1.4V	1.42V
40	2.3V	2.16V
41	1.08V	1.58V
42	1.82V	1.84V
43	2.04V	2.28V
44	0V	0V
45	2.88V	3.04V
46	2V	2.98V
47	4.82V	4.78V
48	120mV	2.4V
49	3.48V	1.94V
50	4.78V	4.74V
51	2.08V	1.98V
52	4.8V	4.7V
53	2.6V	2.8V
54	0V	0V

MODE / PIN NO.	EE	PLAY
55	1.3V	1.48V
56	0V	0V
57	2.08V	2.18V
58	1.78V	2.14V
59	4.6V	4.62V
60	4.62V	4.62V
61	3.82V	0V
62	2.2V	2.08V
63	2.32V	2.32V
64	1.62V	1.64V
65	1.62V	2.28V
66	2.3V	1.68V
67	0V	0V
68	1.12V	1.14V
69	2.3V	2.38V
70	0.82V	0.82V
71	2.2V	2.18V
72	100m	2.42V
73	4.96V	4.98V
74	4.96V	4.98V
75	2.56V	2.54V
76	2.34V	2.18V
77	2.68V	2.64V
78	0V	4.72
79	0V	0V
80	2.16V	2.68V
81	4.06V	20m
82	0V	0V
83	120m	2.72V
84	2.76V	4.74V
85	2.114V	2.42V
86	2.04V	2.08V
87	2.04V	2.08V
88	0V	0V
89	2.14V	2.08V
90	2.14V	2.08V
91	2.14V	2.08V
92	4.88V	4.89V
93	300m	260m
94	2.48V	2.4V
95	2.48V	1.86V
96	2.06V	1.86V
97	0V	0V
98	2.30V	2.46V
99	0V	20m
100	2.48V	2.42V
IC501		
1	0V	0V
2	4.52V	4.82V
3	4.84V	4.84V
4	4.64V	4.58V
5	4.56V	4.56V
6	80m	60m
7	0V	0V
8	4.98V	4.98V

MODE / PIN NO.	EE	PLAY
9	4.98V	5.3V
10	4.8V	4.8V
11	4.82V	4.82V
12	4.72V	4.82V
13	4.92V	4.92V
14	5.02V	5.02V
15	0V	0V
16	4.98V	4.98V
17	5.04V	5.04V
18	4.98V	9.98V
19	2.46V	2.46V
20	3.36V	3.36V
21	0V	0V
22	0V	0V
23	4.96V	4.96V
24	120m	140m
25	4.94V	4.94V
26	4.92V	4.92V
27	20m	20m
28	5.02V	5.02
29	4.98V	4.98V
30	4.84V	4.84V
31	5V	5V
32	0V	0V
33	4.98V	4.94V
34	0V	5V
35	5.02V	0V
36	3.16V	4.94V
37	5.7V	Da/Clk(5.5)
38	0V	5.7V
39	520m	0V
40	4.84V	520m
41	4.83V	Da/Clk(5.62)
42	4.86V	4.86V
43	0V	0V
44	5.02V	5V
45	0V	0V
46	3.94V	3.94V
47	2.88V	2.88V
48	0V	0V
49	0.98V	2.94V
50	1.84V	1.94V
51	0.98V	4.78V
52	3.28V	3.28V
53	2.38V	2.38V
54	2.52V	2.54V
55	1.88V	1.88V
56	0V	0V
57	0V	0V
58	120m	120m
59	4.92V	4.92V
60	4.92V	4.92V
61	0V	0V
62	4.82V	4.82V
63	3.98V	3.98V

MODE / PIN NO.	EE	PLAY
64	0V	0V
65	2.36V	2.63V
66	0V	0V
67	4.68V	9.68V
68	0V	0V
69	2.48V	2.48V
70	2.48V	2.48V
71	0V	0V
72	2.48V	4.98V
73	4.92V	4.92V
74	0V	0V
75	2.52V	2.42V
76	2.42V	2.48V
77	80m	80m
78	0V	0V
79	4.02V	4.96V
80	4.96V	4.96V
81	2.8V	280m
82	1V	2.62V
83	120m	3.24V
84	0V	1.96V
85	0V	0V
86	4.98V	4.9V
87	4.98V	4.98V
88	5V	5V
89	0V	0V
90	4.88V	4.88V
91	0V	0V
92	0V	0V
93	5.04V	5.04V
94	4.88V	0V
95	4.98V	4.98V
96	0V	0V
97	0V	0V
98	4.98V	4.98V
99	20m	4.98V
100	0V	0V
IC7V1		
2	0V	0V
3	0V	142m
4	DA/CL(5.34)	DA/CL(5.34)
5	DA/CL(5.34)	DA/CL(5.34)
6	0V	0V
7	DA/CL(5.34)	DA/CL(5.34)
8	0V	0V
9	DA/CL(5.34)	DA/CL(5.34)
10	DA/CL(5.34)	DA/CL(5.34)
11	0V	0V
12	DA/CL(2.82)	DA/CL(2.82)
13	0V	
14	DA/CL(2.82)	DA/CL(62m)
15	2.89	1.41V
16	1.53	950m
17	DA/CL(1.14)	DA/CL(810m)
18	0V	0V

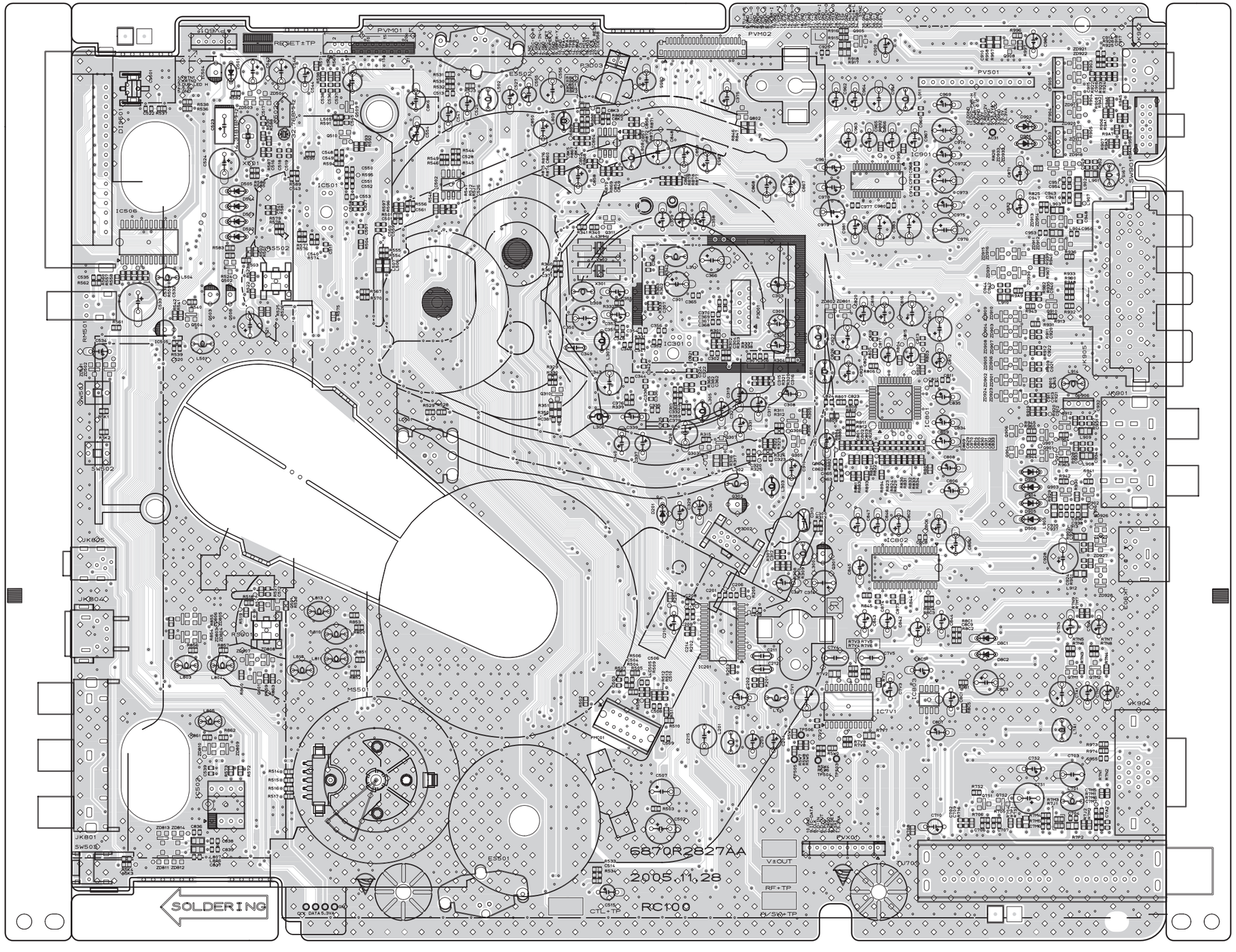
MODE / PIN NO.	EE	PLAY
19	5.26V	5.24V
20	5.26V	5.24V
IC801		
1	3.28V	3.24V
2	3.28V	3.28V
3	3.32V	3.26V
4	3.28V	3.92V
5	3.28V	3.92V
6	3.28V	3.26
7	3.28V	3.74V
8	3.28V	3.24V
9	3.28V	3.24V
10	3.28V	3.24V
11	3.28V	3.26V
12	0V	0V
13	3.78V	4.52V
14	0V	0V
15	0V	640m
16	5.82V	6.64V
17	5.82V	6.68V
18	0V	620m
19	6.28V	6.66V
20	6.28V	6.72V
21	4.46V	4.42V
22	3.28V	4.02V
23	3.62V	3.68V
24	3.74V	4.12V
25	3.74V	3.76V
26	0.1V	640m
27	0V	0V
28	3.7V	3.68V
29	3.66V	3.64V
30	0.7V	680m
31	3.72V	3.72V
32	3.74V	4.08V
33	3.62V	3.68V
34	13.4V	13.32V
35	3.62V	520m
36	13.4V	520V
37	580m.	520V
38	0V	0V
39	0V	20m
40	4.7V	4.76V
41	0V	1.68V
42	5V	5.04V
43	5V	4.96
44	20m	3.38

E-MODE NO.	E	C	B
Q501	0	0	740M
Q503	5.19	5.19	4.57
Q504	Y/C_VIDEO	0	Y/C_VIDEO
Q505	Y/C_VIDEO	0	Y/C_VIDEO
Q506	0	2Fsc	2Fsc
Q514	0	0	4.87
Q515	0	0	4.87
Q301	0	5.04	0
Q302	5.04	0	5.04
Q303	0	0	0
Q304	0	0	0
Q306	4.93	4.81	4.79
Q308	Y/C_VIDEO	0	Y/C_VIDEO
Q311	5.04	5.04	0
Q7S1	0	1.47	0
Q7S2	0	0	5.13
Q901	5.1	0	4.5
Q902	0	0	0
Q903	0	0	0
Q904	0	4.5	0
Q905	2.69	0	2
Q906	1.7	0	1.7
Q907	11.9	11.8	0
Q908	0	0	5
Q909	0	7.4	0
Q910	4.6	5	5.1

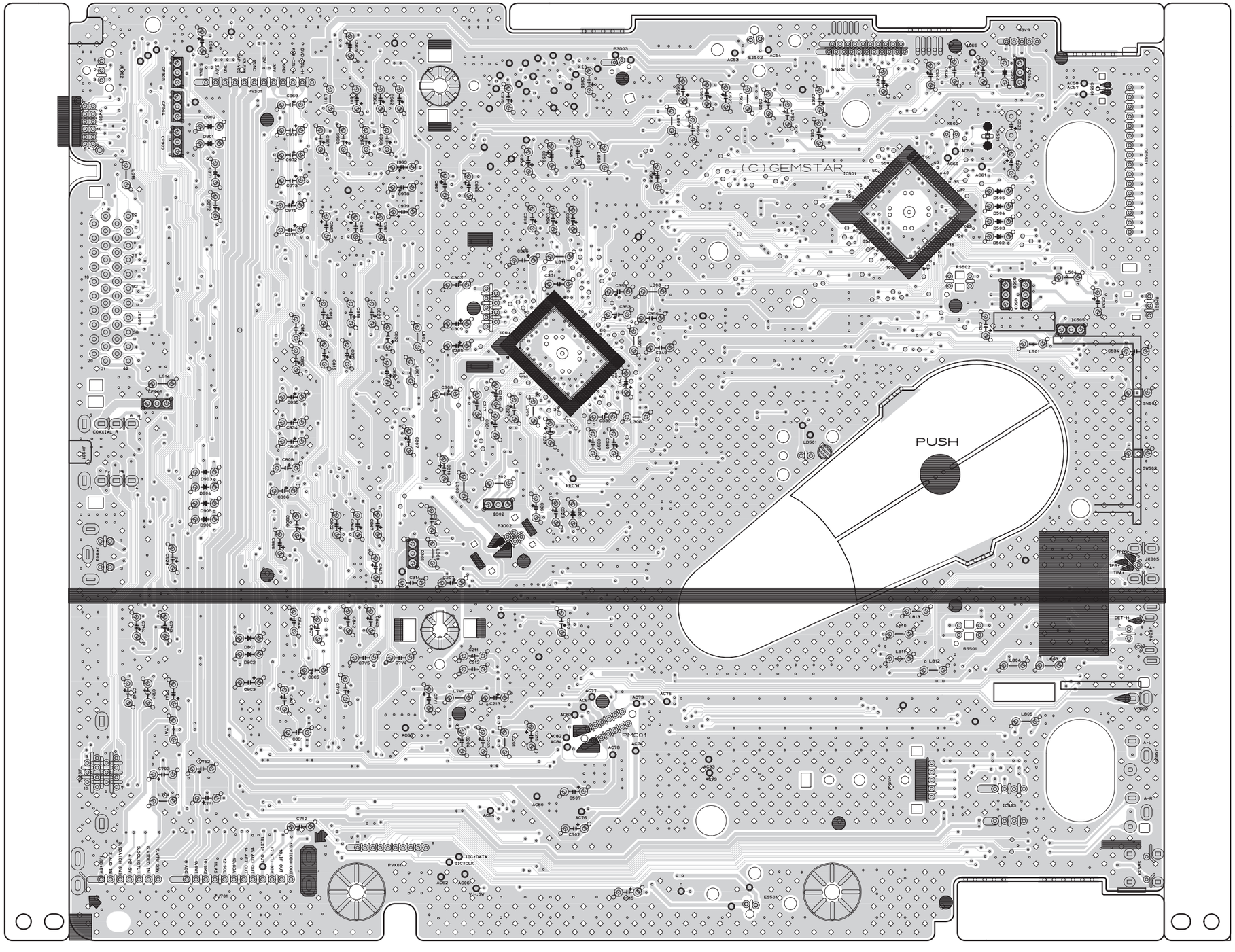
SECTION NO.	POWER ON			PB		
	E	C	B	E	C	B
SYSTEM						
Q501	0.010V	0.020V	4.800V	0.010V	4.950V	4.770V
Q502	0.010V	0.020V	4.800V	0.010V	4.970V	4.770V
Q503	4.510V	5.190V	5.200V	4.500V	5.180V	5.190V
Q504	0.010V	0.020V	0.690V	0.010V	0.020V	0.690V
Q509	2.360V	0.010V	1.750V	3.060V	0.010V	2.410V
Q510	2.350V	0.010V	1.720V	3.010V	0.010V	2.410V
AVCP						
Q301	0.170V	0.170V	0.000V	0.160V	0.160V	0.000V
Q302	4.980V	0.170V	4.980V	4.970V	0.160V	4.970V
Q303	0.010V	4.960V	0.040V	0.010V	4.960V	0.030V
Q305	0.010V	0.010V	0.710V	0.010V	0.010V	0.710V
Q306	0.010V	0.010V	0.720V	0.010V	0.010V	0.720V
Q307	4.990V	4.940V	0.040V	4.960V	4.910V	0.030V
Q310	2.650V	1.710V	1.980V	3.080V	0.010V	2.410V
HI-FI/CANAL/F.JACK/AMP						
Q801	4.980V	0.010V	4.980V	4.960V	0.010V	4.950V
TUNER						
Q7S1	1.270V	0.000V	0.000V	1.260V	0.000V	
Q7S2	0.000V	4.890V	0.000V	0.000V	4.880V	0.000V
JACK						
Q901	5.180V	0.000V	4.610V	5.170V	0.000V	4.600V
Q902	0.000V	0.040V	0.000V	0.000V	0.050V	0.000V
Q903	0.000V	0.050V	0.000V	0.000V	0.100V	0.000V
Q904	0.000V	4.610V	0.000V	0.000V	4.600V	0.000V
Q905	2.330V	0.010V	1.650V	2.330V	.010V	1.690V
Q906	0.000V	4.610V	0.000V	0.000V	4.600V	0.000V
Q907	5.180V	0.000V	4.610V	5.170V	0.000V	4.600V
Q910	0.000V	5.100V	0.000V	0.000V	5.090V	0.000V
Q911	0.000V	0.000V	0.000V	0.000V	0.000V	0.000V
Q912	0.000V	0.000V	0.000V	0.000V	0.000V	0.000V

PRINTED CIRCUIT DIAGRAMS

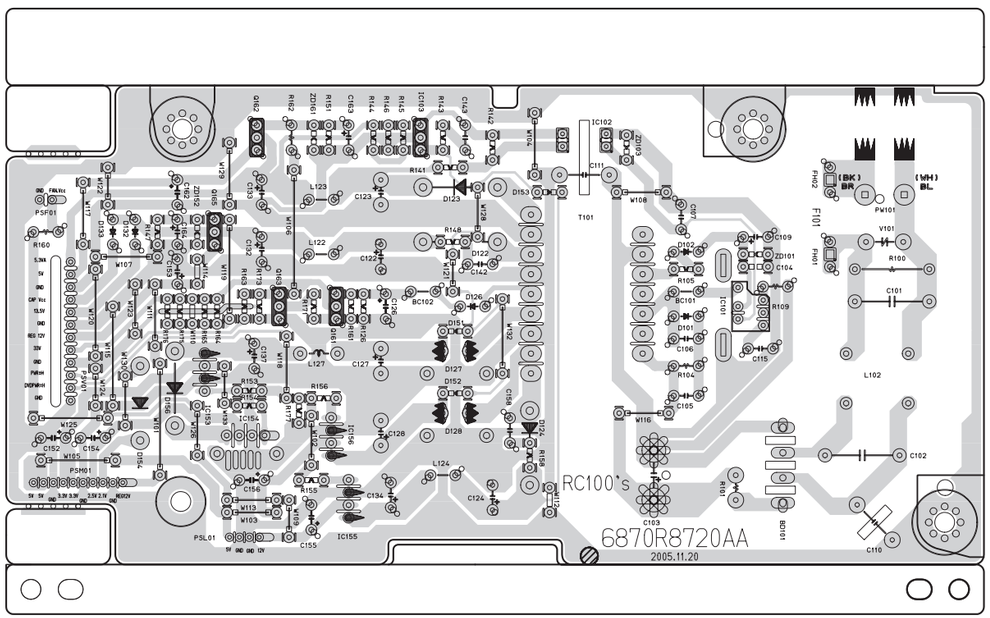
1. VCR P.C.BOARD(TOP VIEW)



2. VCR P.C.BOARD(BOTTOM VIEW)

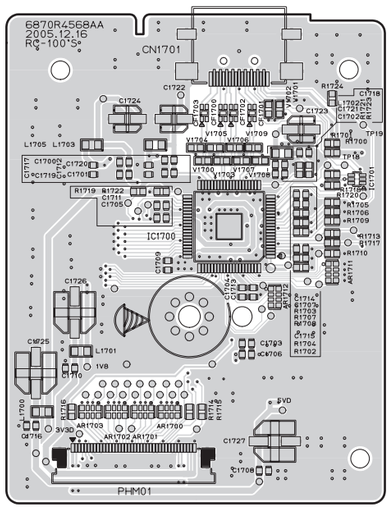


3. SMPS P.C.BOARD

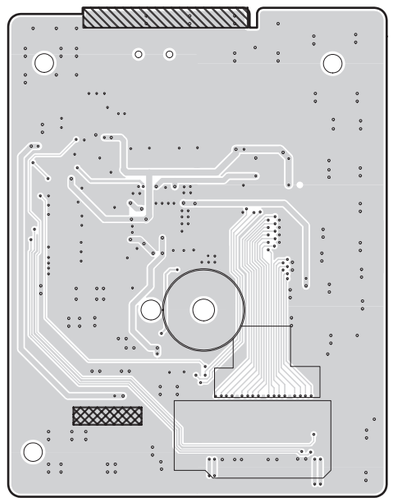


4. HDMI P.C.BOARD(HDMI MODEL ONLY)

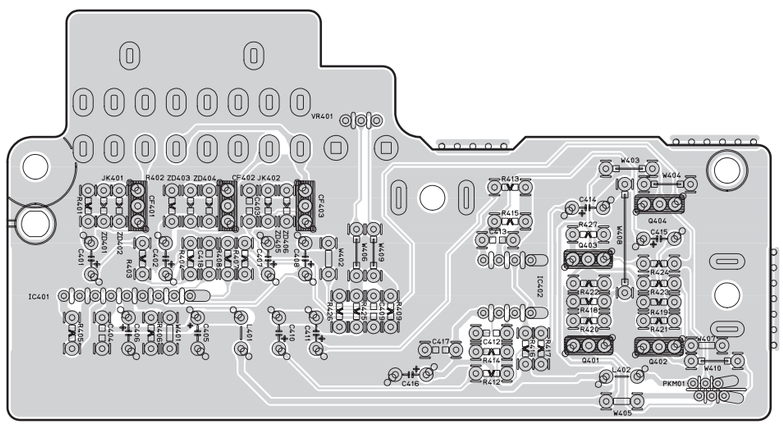
(TOP VIEW)



(BOTTOM VIEW)

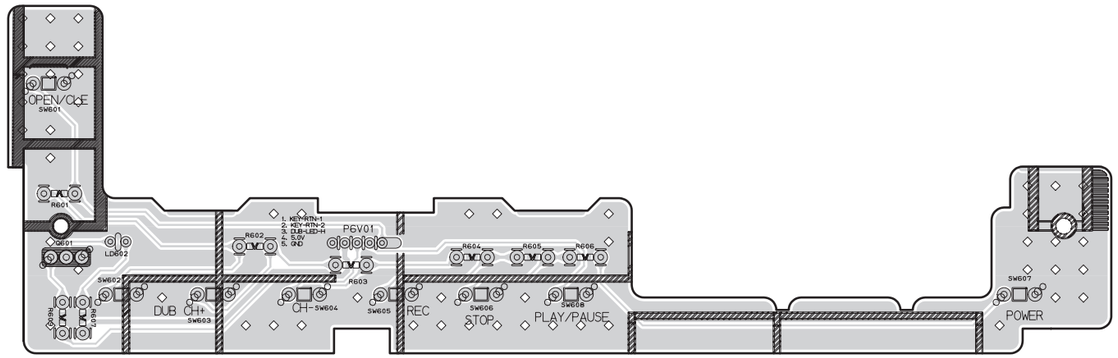


5. KARAOKE P.C.BOARD (KARAOKE MODEL ONLY)

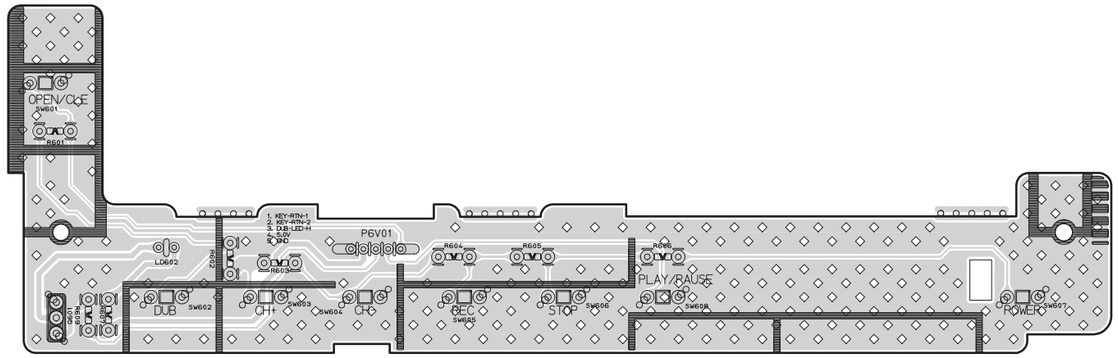


6. KEY P.C.BOARD

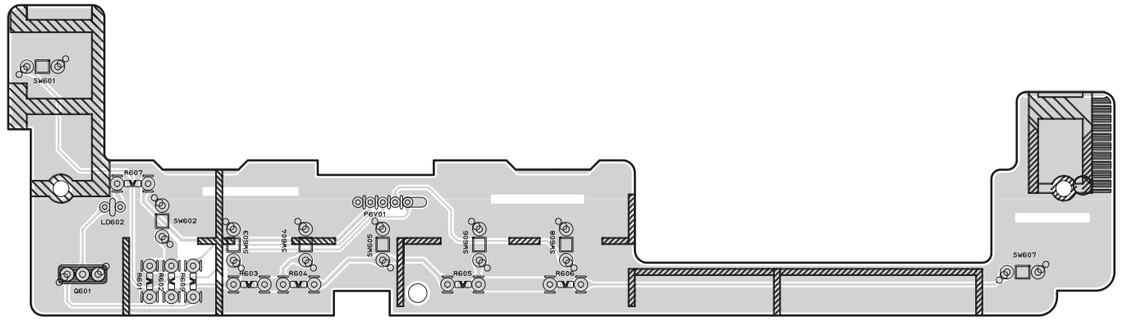
(7 TOOL)



(8 TOOL)



(9 TOOL)

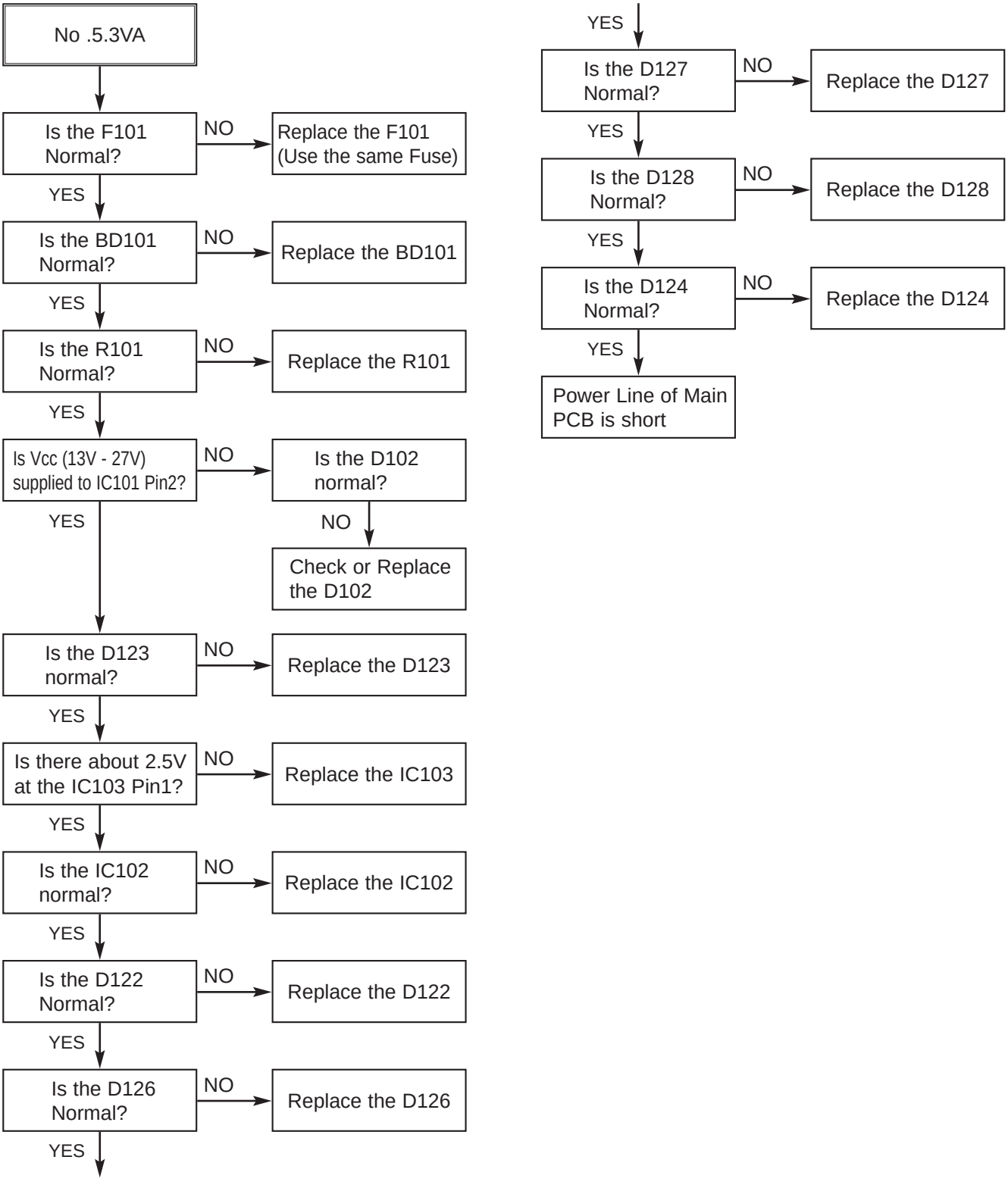


MEMO

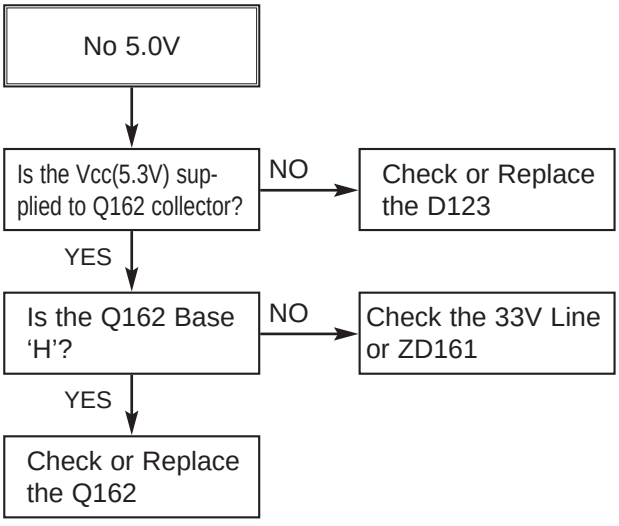
MEMO

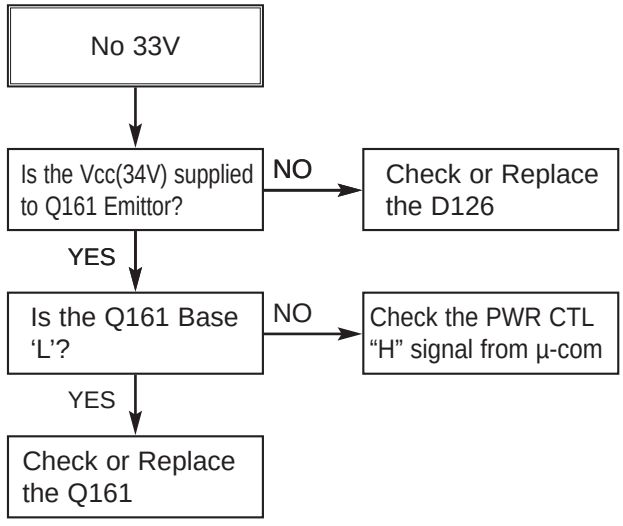
VDR PART
VDR ELECTRICAL TROUBLESHOOTING GUIDE

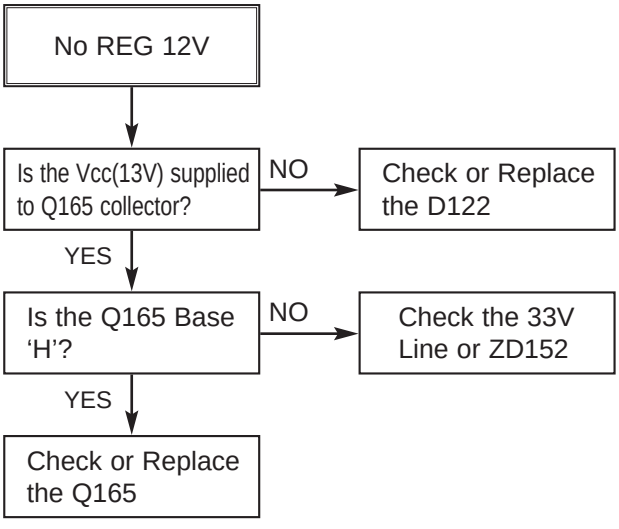
1. POWER(SMPS) CIRCUIT

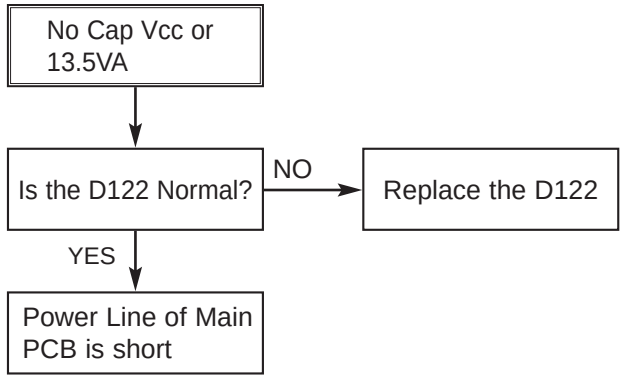


VDR ELECTRICAL TROUBLESHOOTING GUIDE

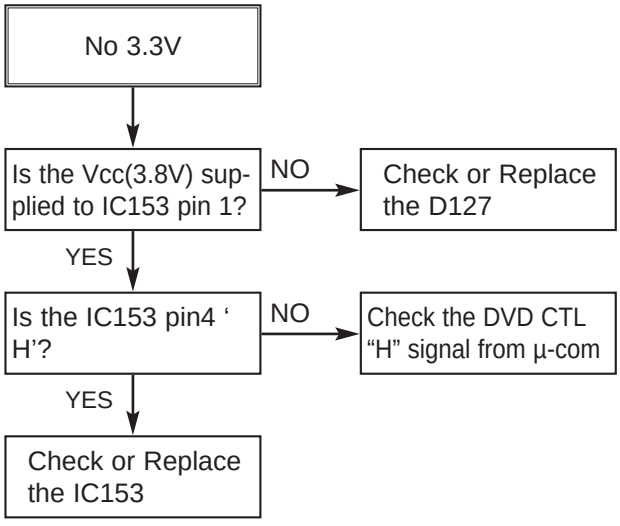


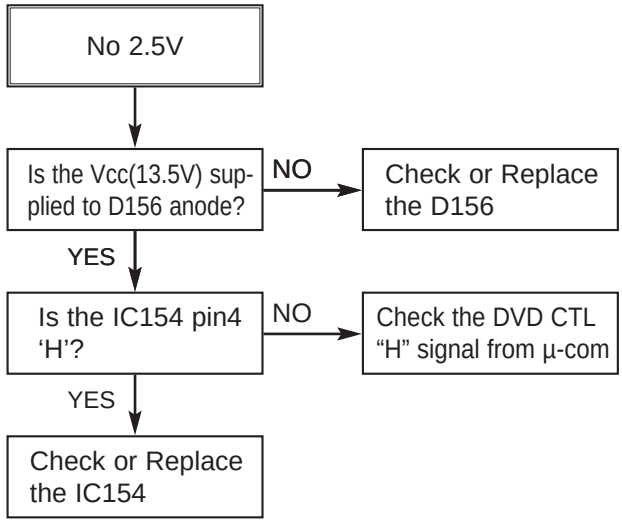


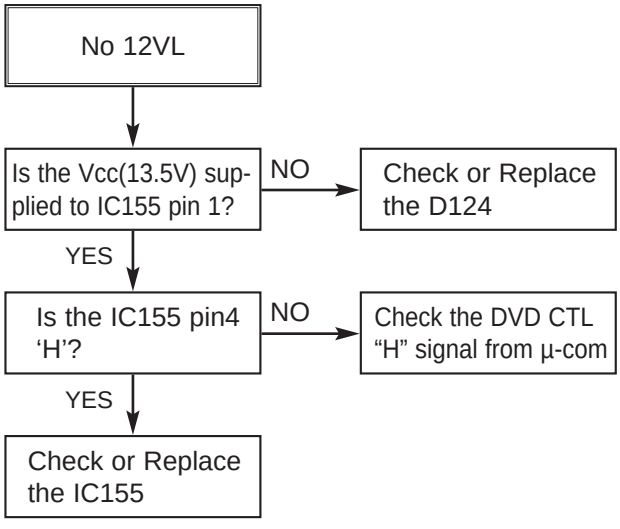


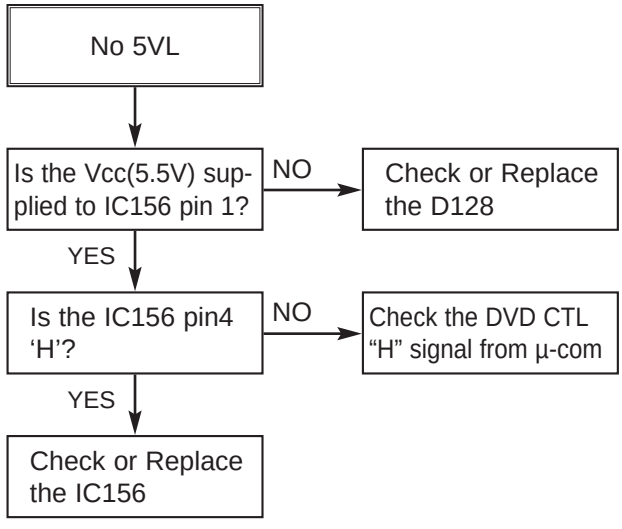


VDR ELECTRICAL TROUBLESHOOTING GUIDE



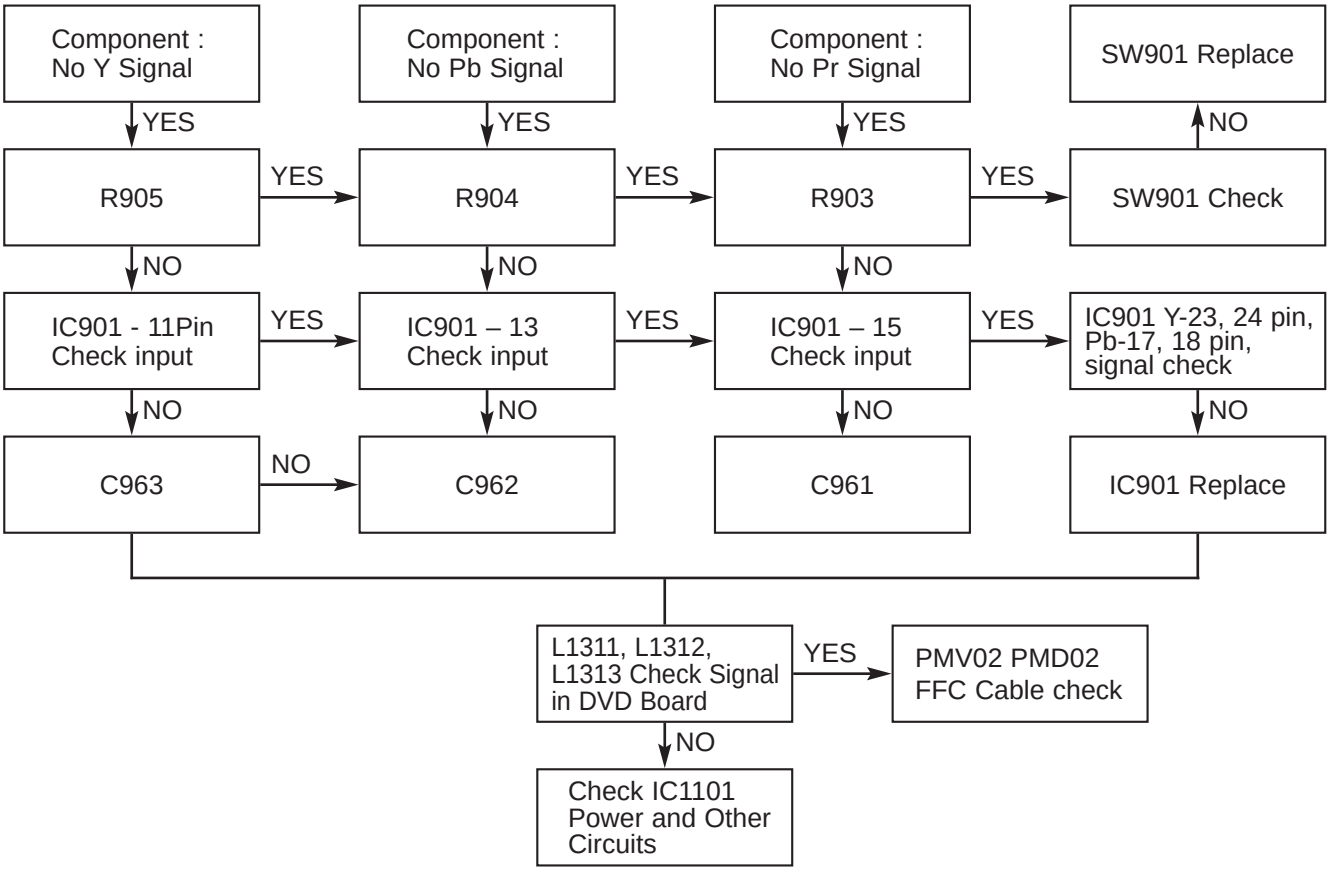






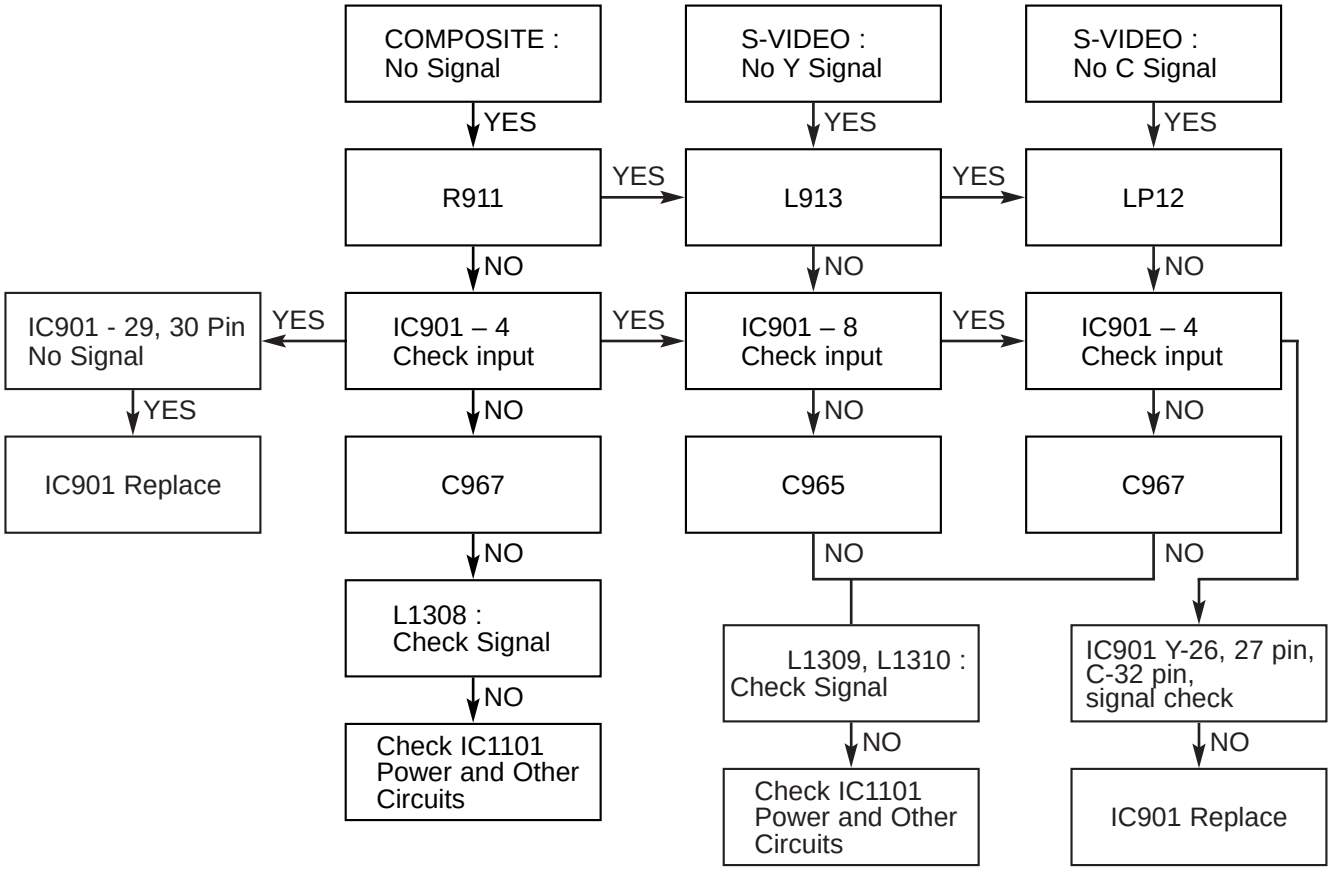
VDR ELECTRICAL TROUBLESHOOTING GUIDE

2. NO COMPONENT VIDEO SIGNAL WHEN PLAYING DISC



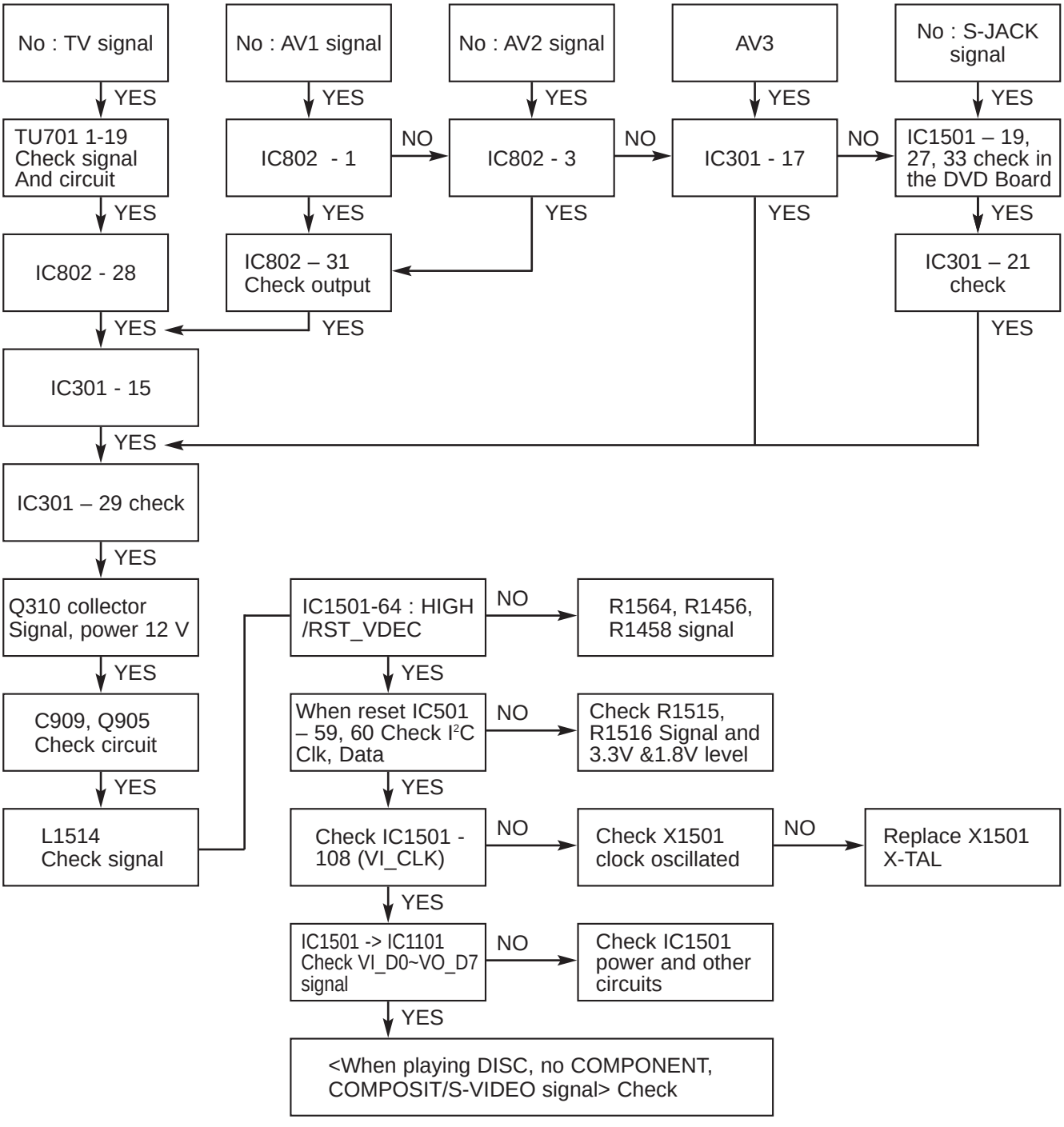
VDR ELECTRICAL TROUBLESHOOTING GUIDE

3. NO COMPOSITE / S-VIDEO SIGNAL WHEN PLAYING DISC



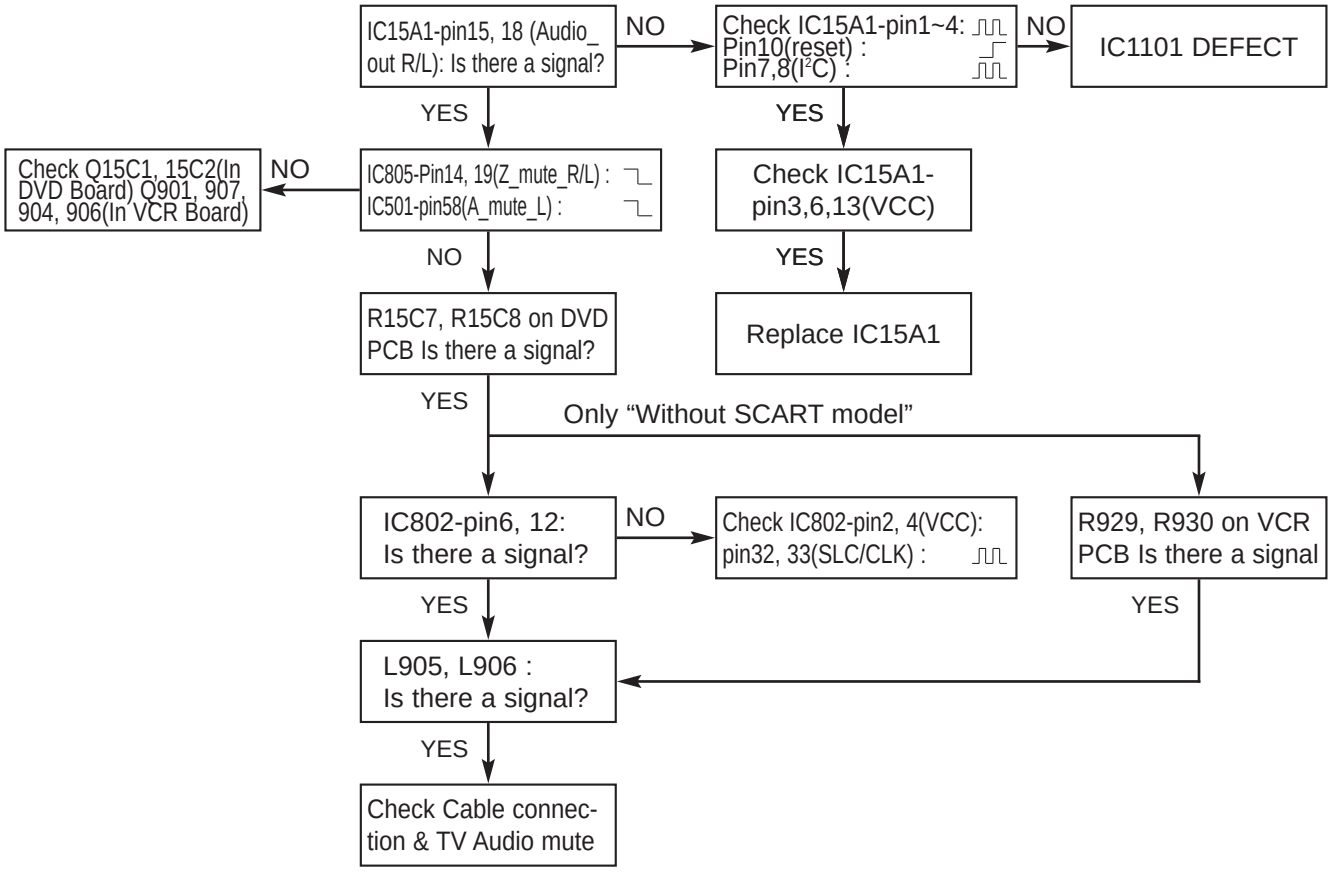
VDR ELECTRICAL TROUBLESHOOTING GUIDE

4. NO TV, EXTERNAL INPUT VIDEO SIGNAL



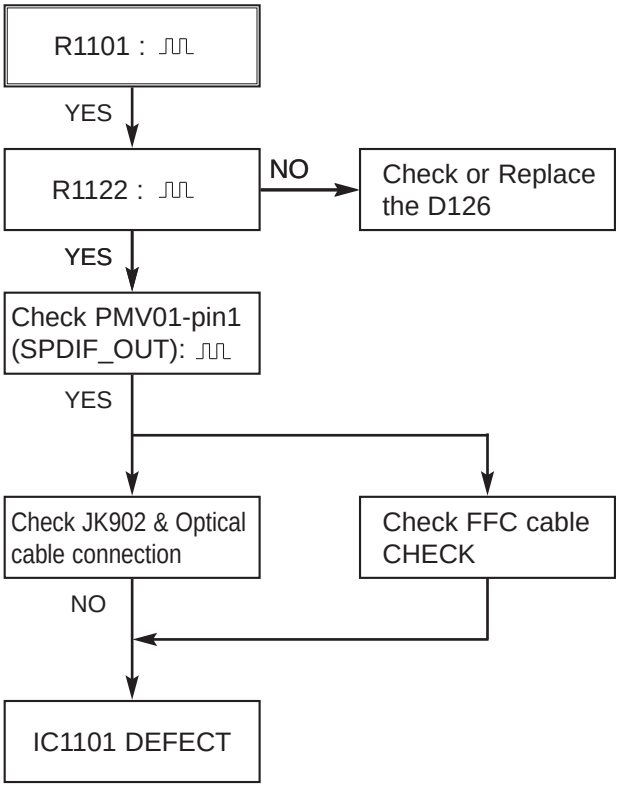
VDR ELECTRICAL TROUBLESHOOTING GUIDE

5. WHEN PLAYING DISC, NO AUDIO OUTPUT



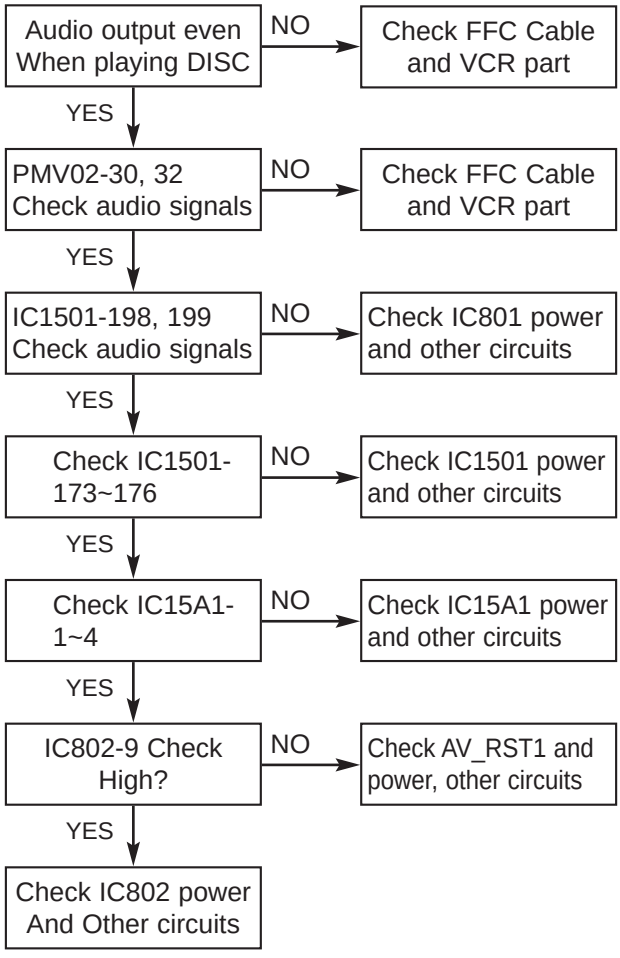
VDR ELECTRICAL TROUBLESHOOTING GUIDE

6. NO OPTICAL / DIGITAL OUTPUT



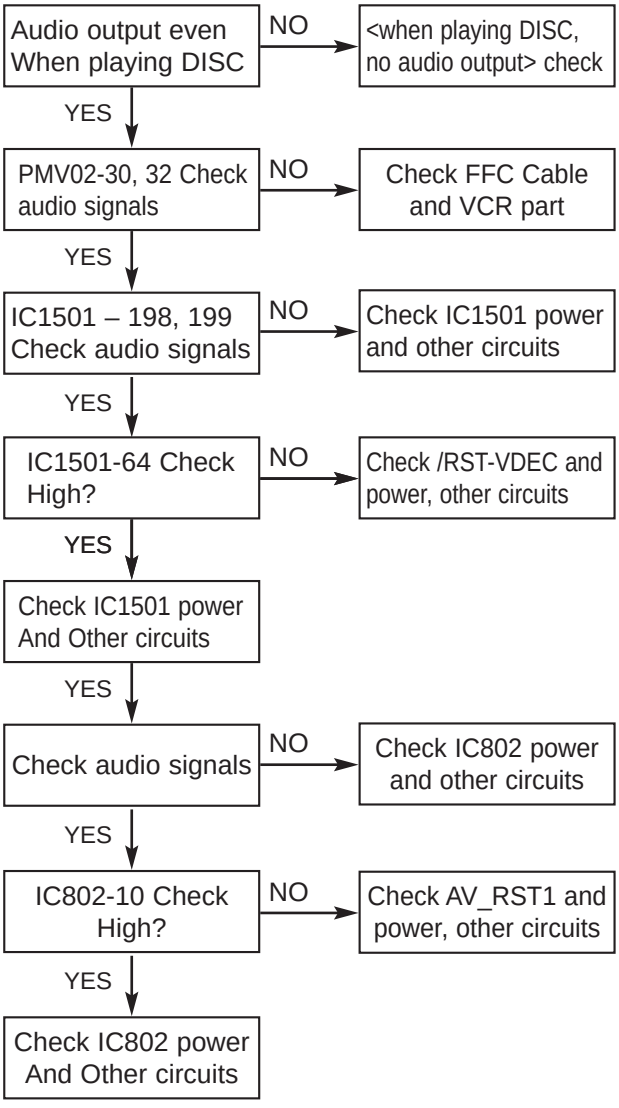
VDR ELECTRICAL TROUBLESHOOTING GUIDE

7. NO TUNER AUDIO OUTPUT



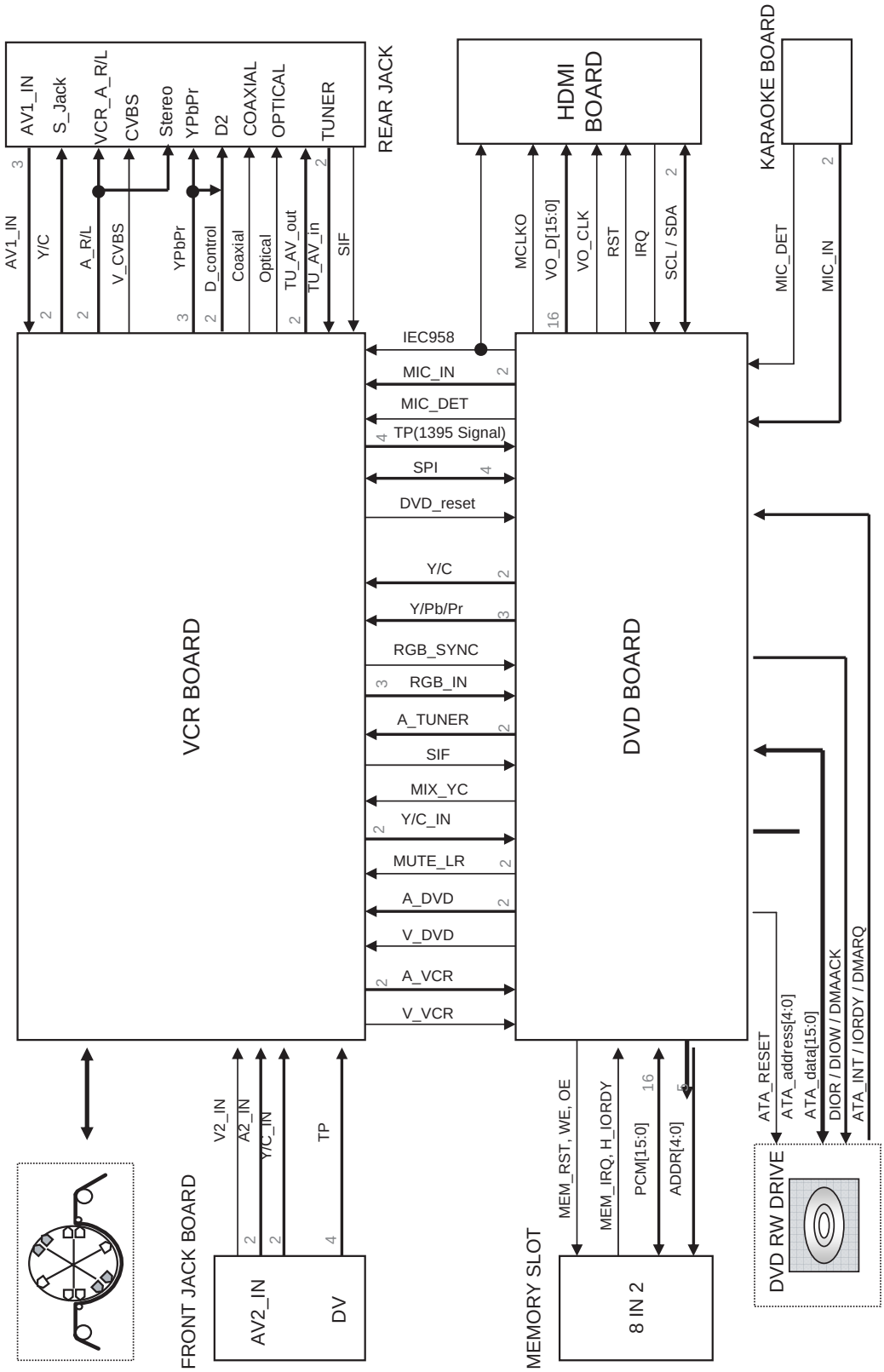
VDR ELECTRICAL TROUBLESHOOTING GUIDE

8. NO EXTERNAL INPUT 1, 2, 3 AUDIO

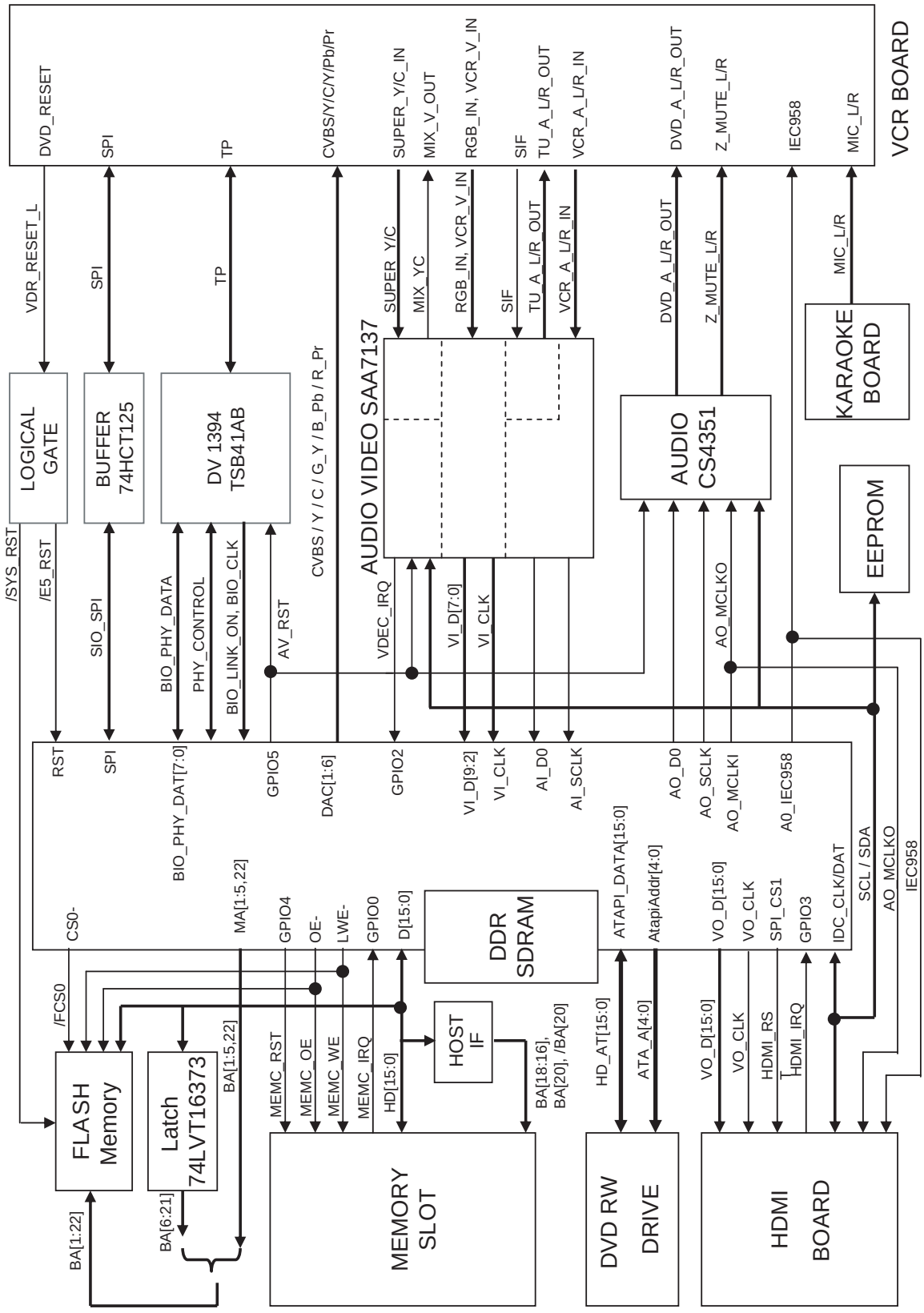


BLOCK DIAGRAMS

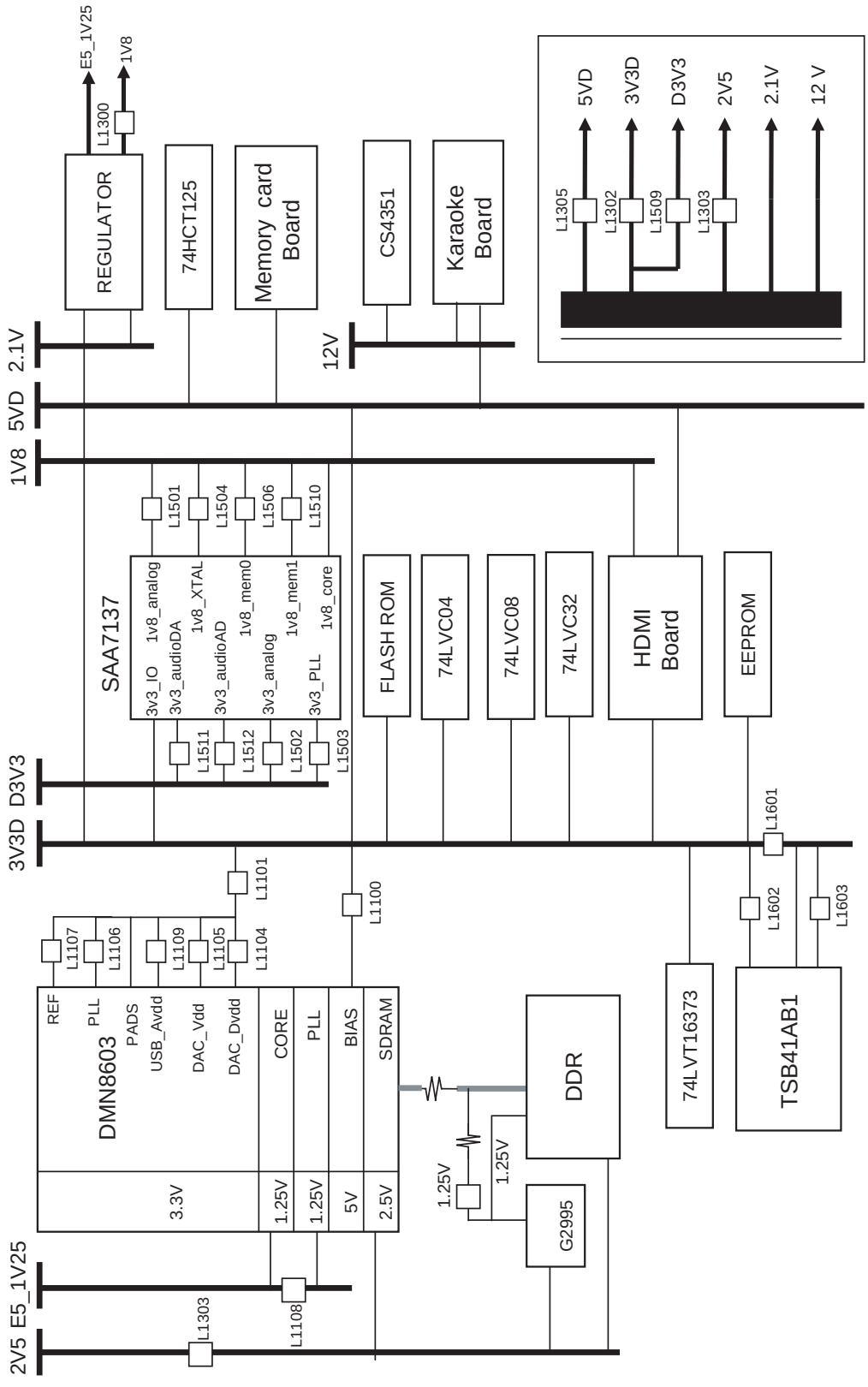
1. VDR SET TOTAL BLOCK DIAGRAM



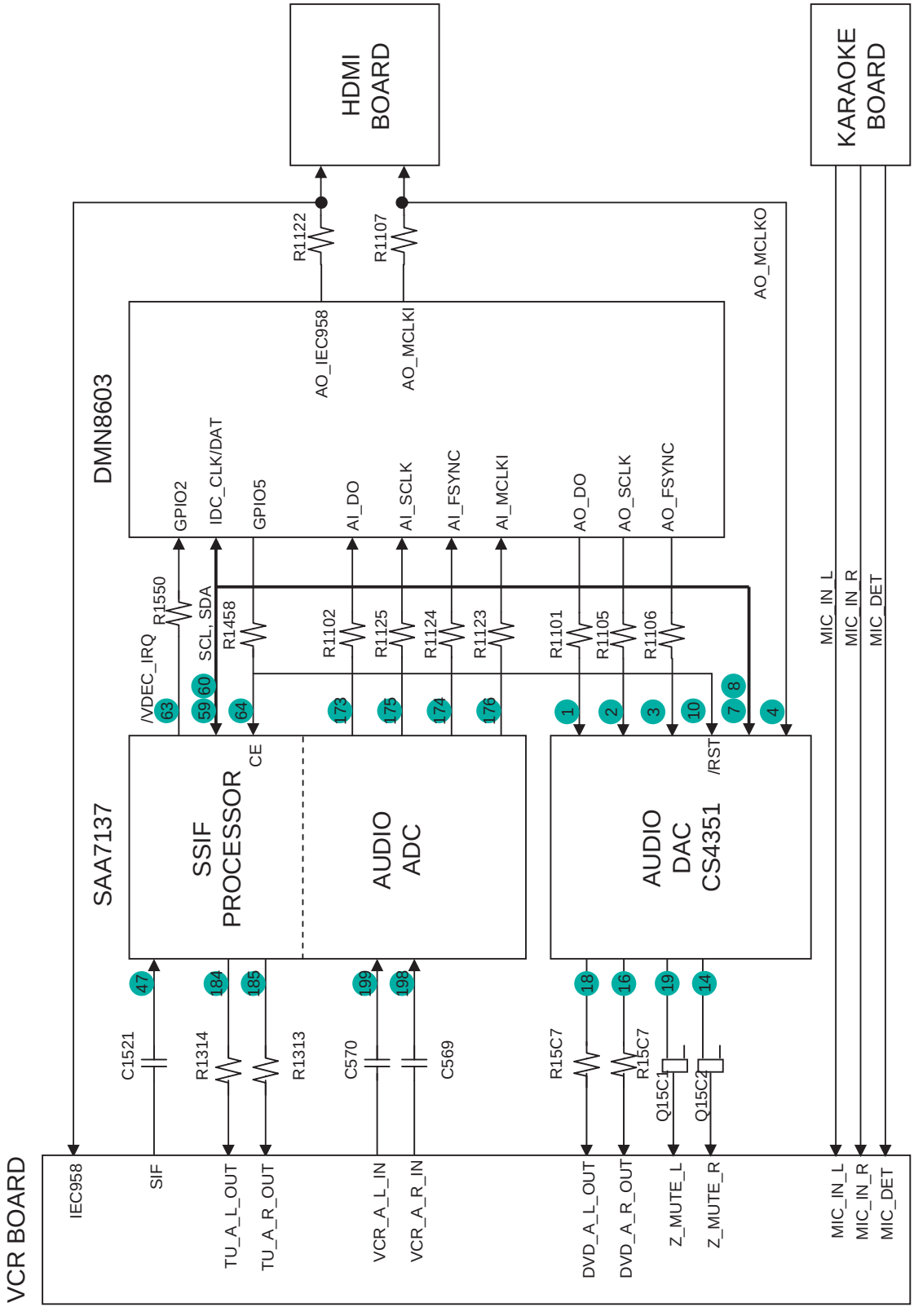
2. VDR MAIN H/W BLOCK DIAGRAM



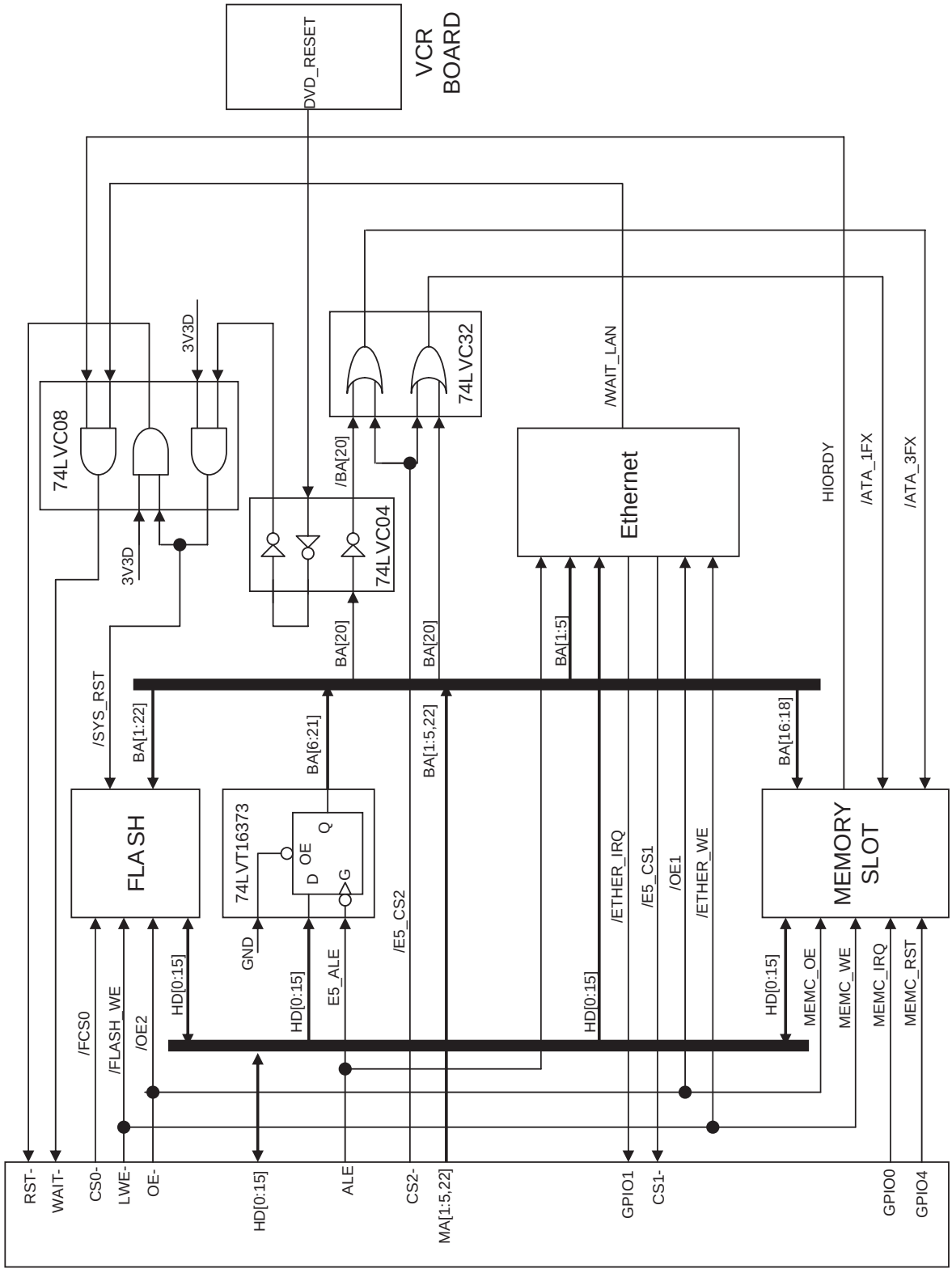
3. POWER BLOCK DIAGRAM



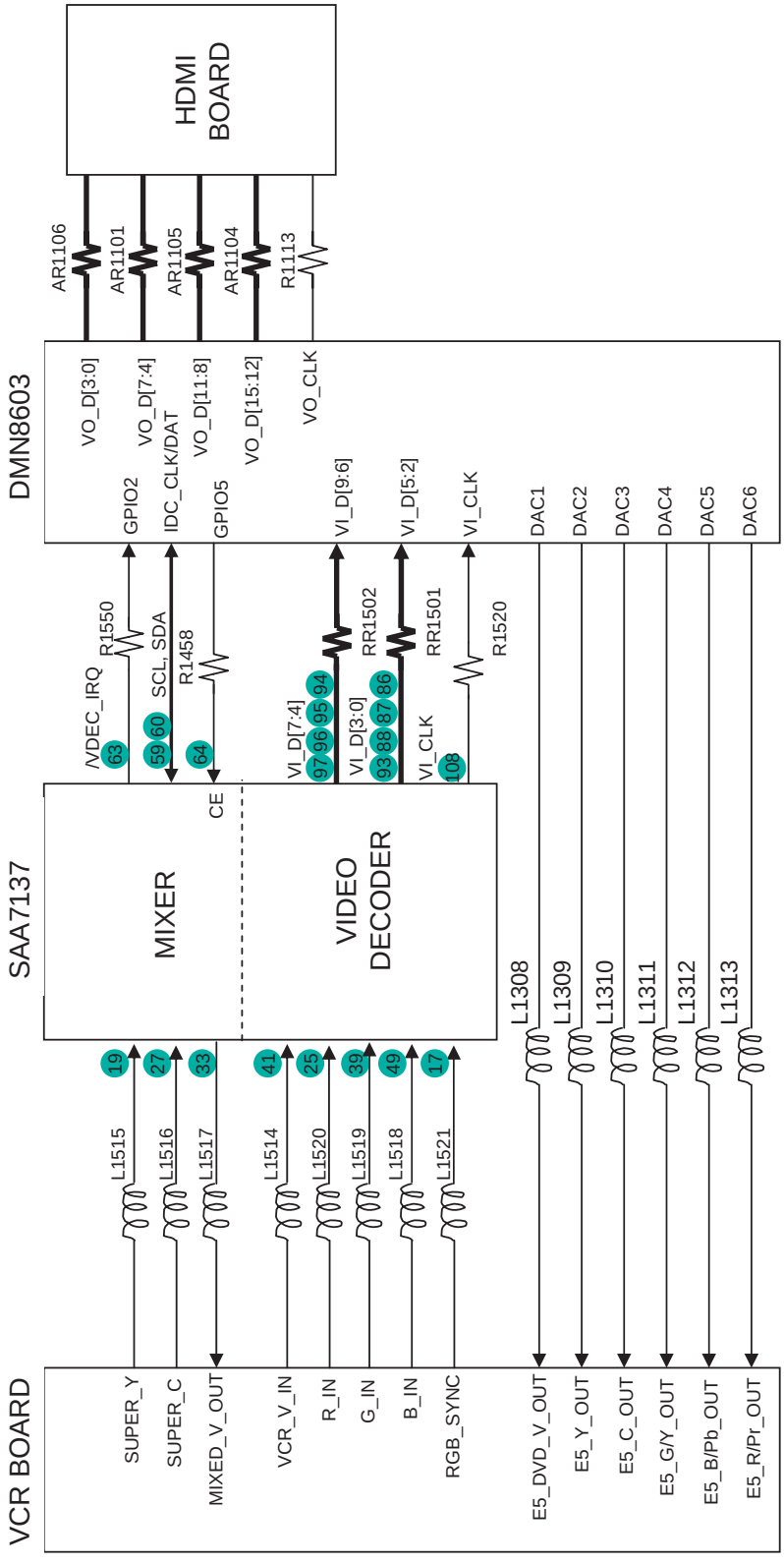
4. AUDIO IN/OUT BLOCK DIAGRAM



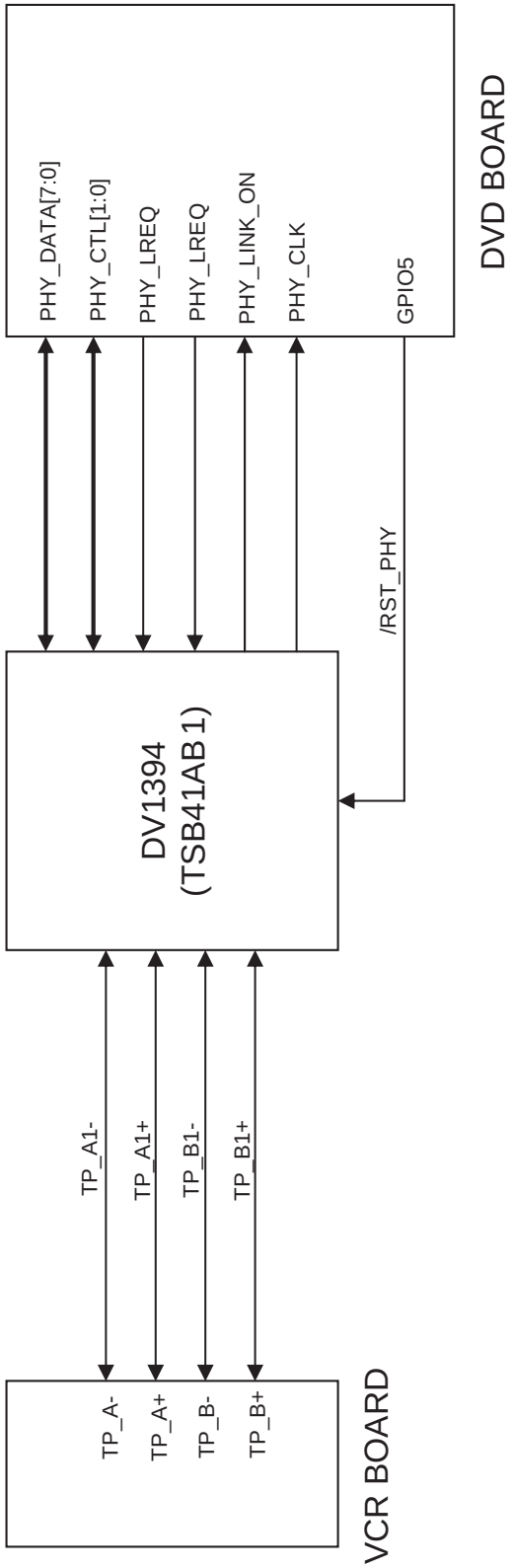
5. CPU & CONTROL REGISTER & MEMORY SLOT BLOCK DIAGRAM



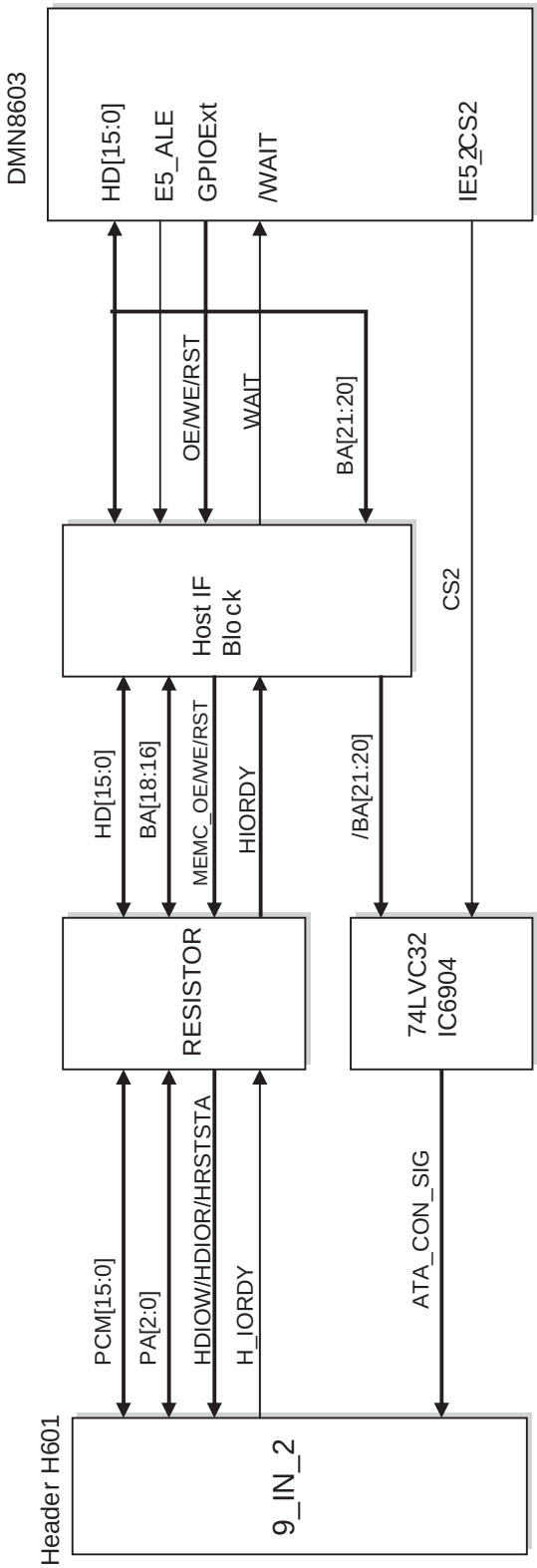
6. VIDEO IN/OUT BLOCK DIAGRAM



7. DV1394 IN/OUT BLOCK DIAGRAM

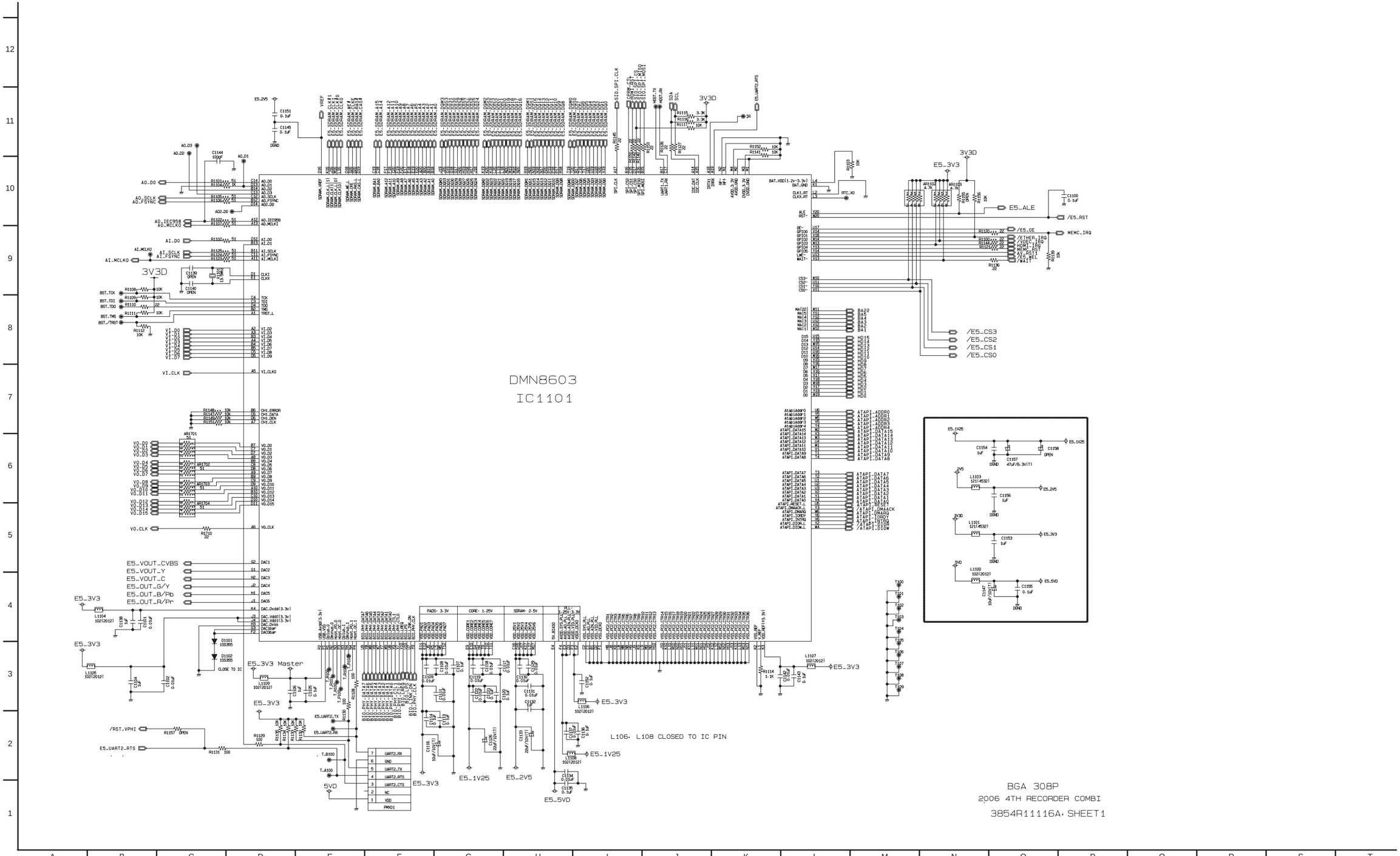


8. MEMORY CARD IN/OUT BLOCK DIAGRAM

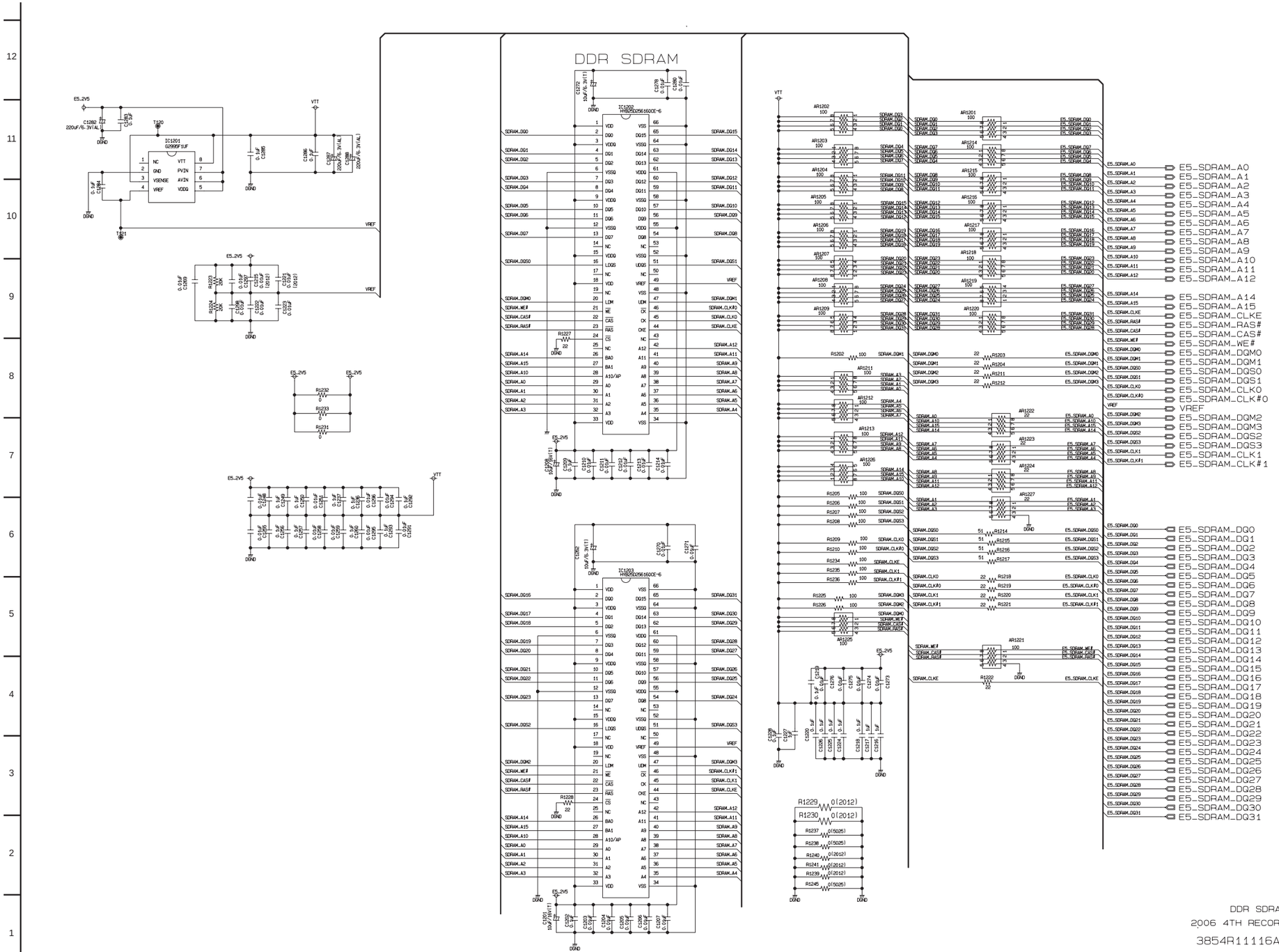


CIRCUIT DIAGRAMS

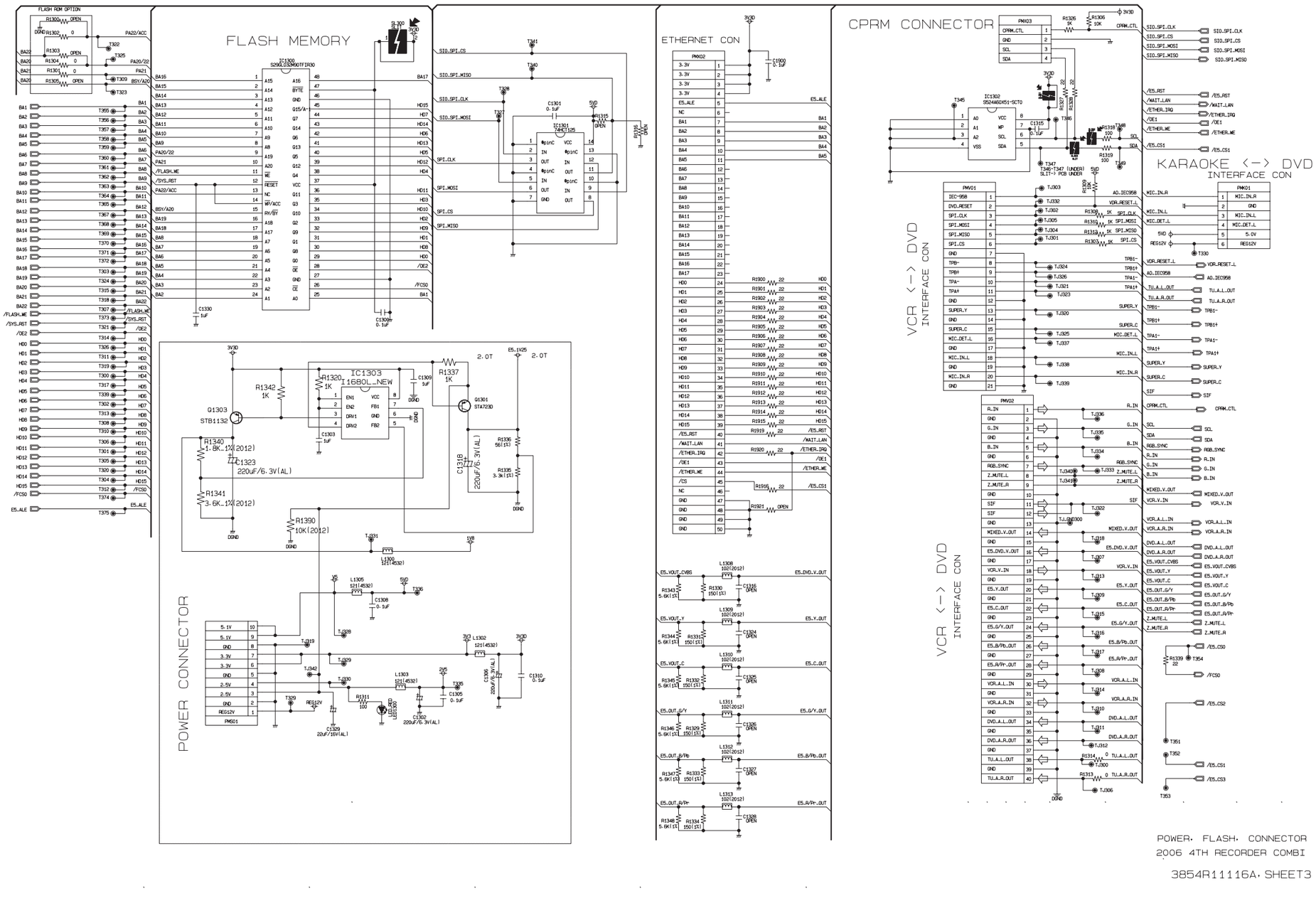
1. BGA 308P CIRCUIT DIAGRAM



2. DDR & B TO B CONNECTOR CIRCUIT DIAGRAM



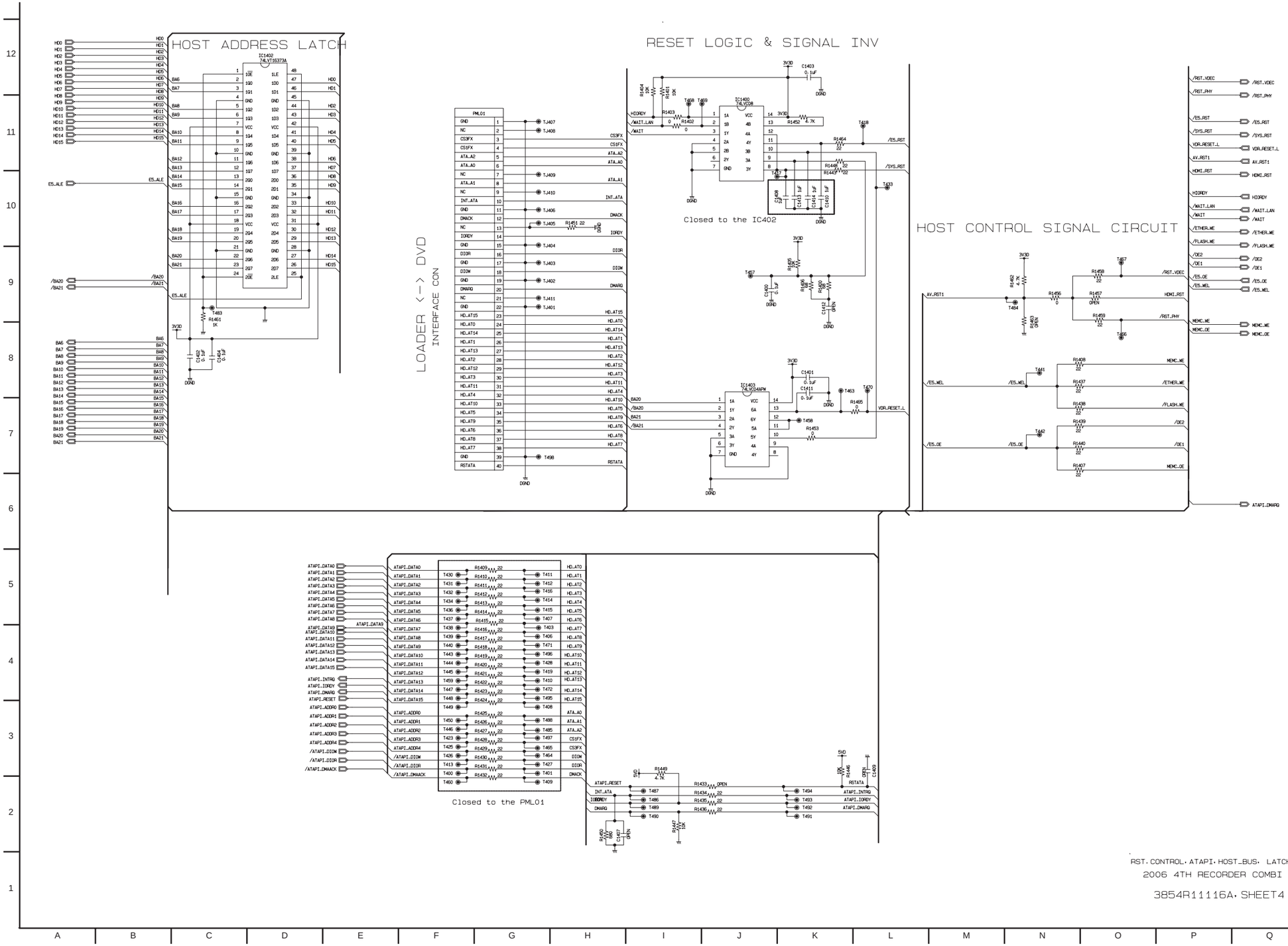
3. POWER, FLASH, CONNECTOR CIRCUIT DIAGRAM



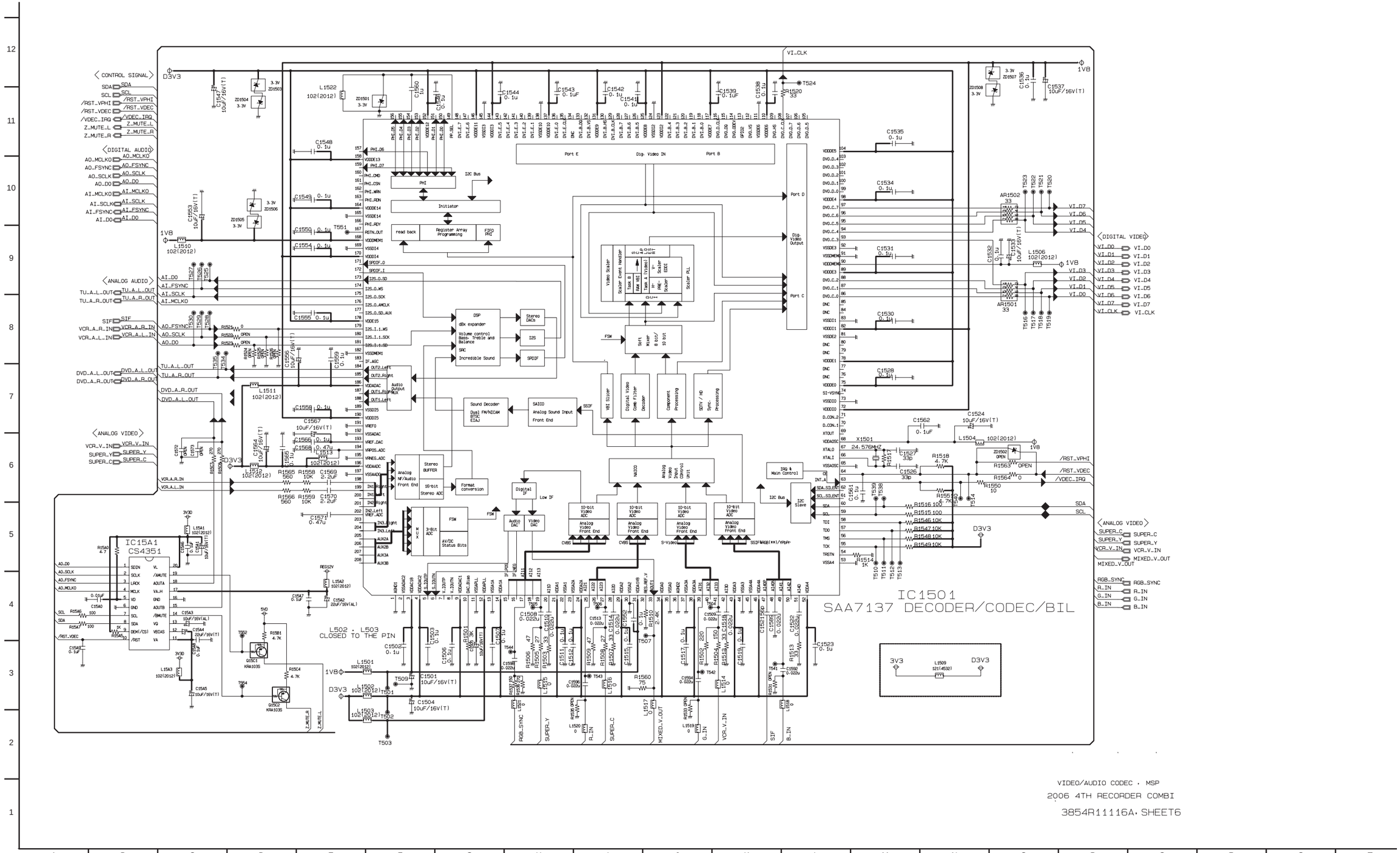
POWER. FLASH. CONNECTOR
2006 4TH RECORDER COMBI

3854R11116A. SHEET3

4. RST, CONTROL/STATUS_REG., ATAPI, HOST_CPLD, LATCH CIRCUIT DIAGRAM



5. VIDEO/AUDIO CODEC, MSP CIRCUIT DIAGRAM

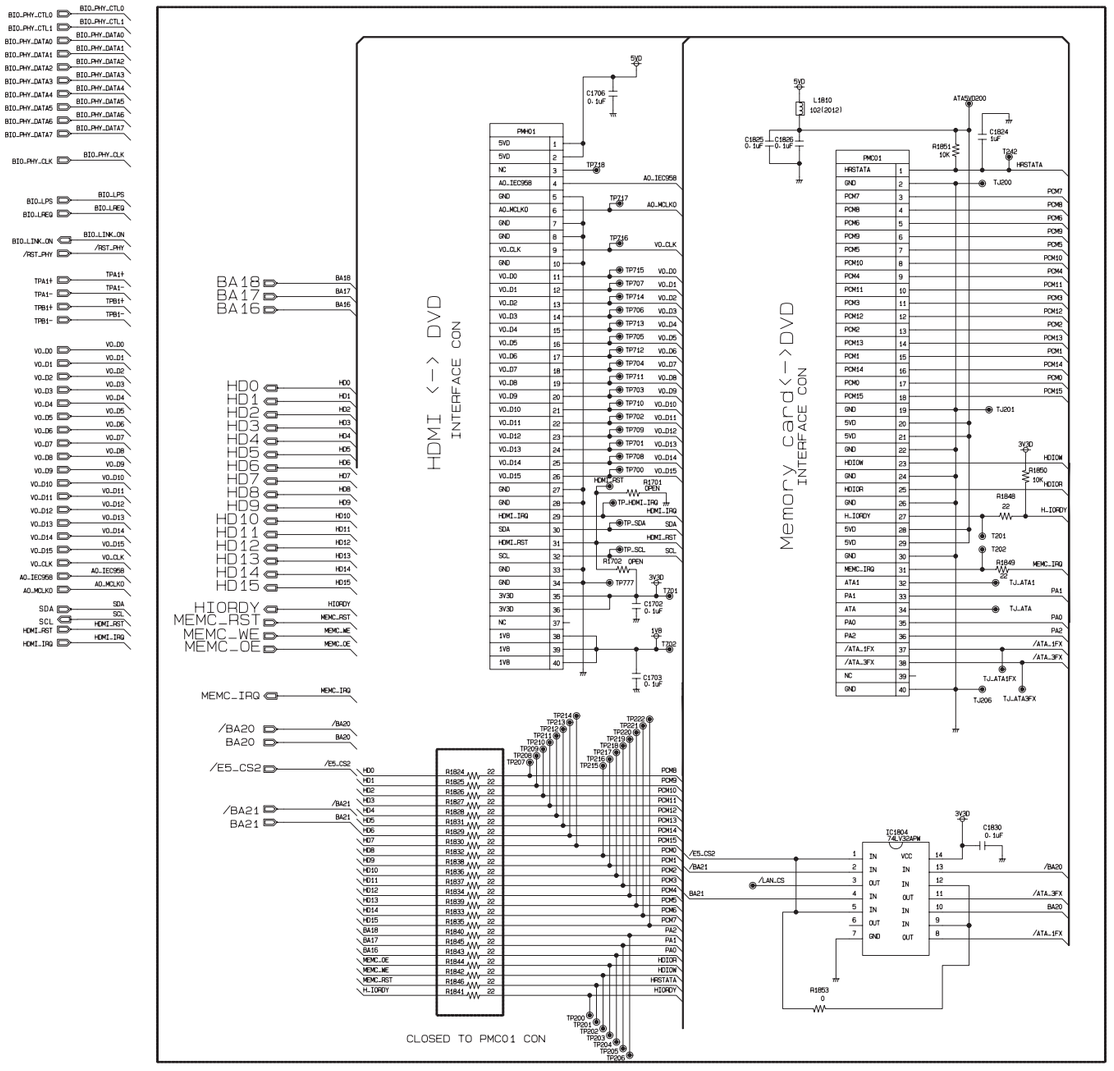


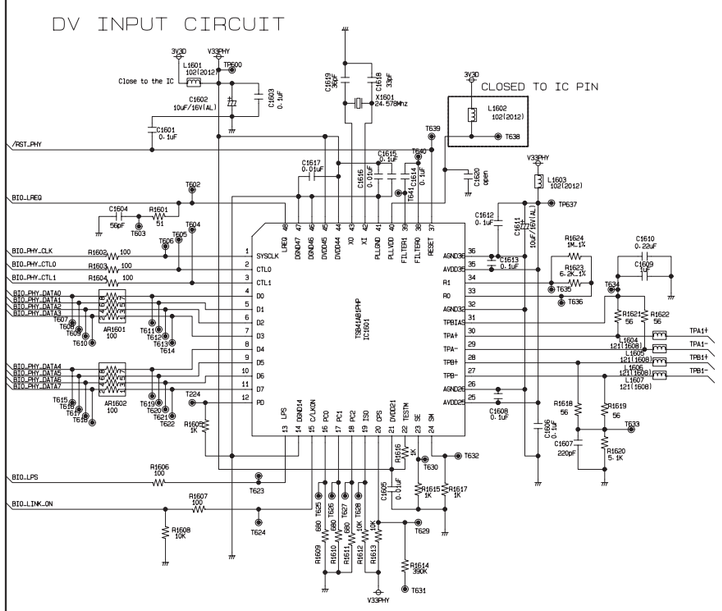
VIDEO/AUDIO CODEC . MSP

2006 4TH RECORDER COMBI

3854R11116A, SHEET6

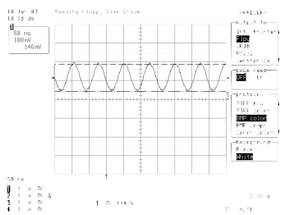
6. DV1394, MEMORY, HDMI CIRCUIT DIAGRAM





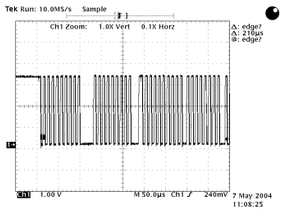
• WAVEFORMS

①



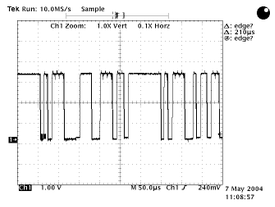
X1101
13.5MHz

②



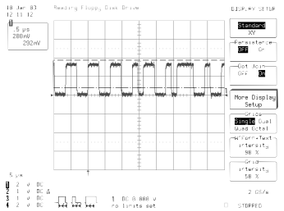
PMX03
PIN3
SCL

③



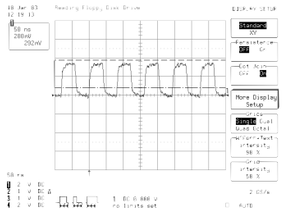
PMX03
PIN4
SDA

⑬



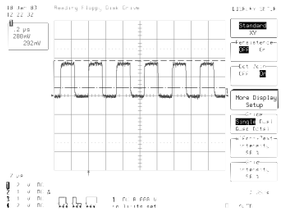
PNV01
PIN1
IEC958

⑭



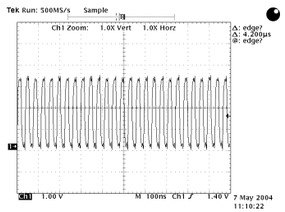
IC1501
PIN176
AI_MCLKO

⑮



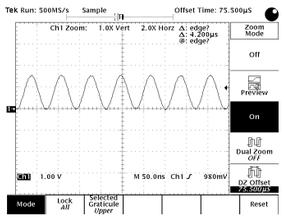
IC1501
PIN175
AI_SCLK

④



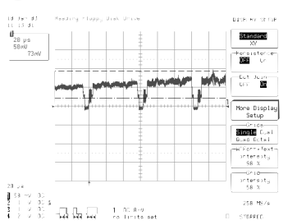
IC1502
PIN108
VI_CLK

⑤



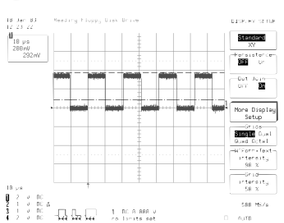
X1501
24.576 MHz

⑥



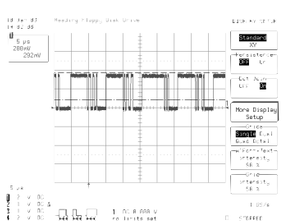
PMV02
PIN16E5_DVD_V_OUT

⑯



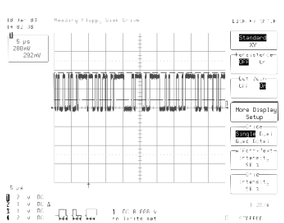
IC1501
PIN174
AI_FSYNC

⑰



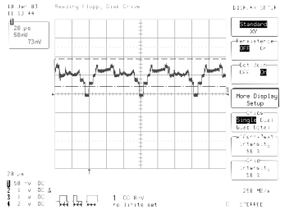
IC1501
PIN173
AI_D0

⑱



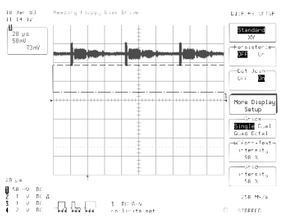
IC15A1
PIN1
AO_D0

⑦



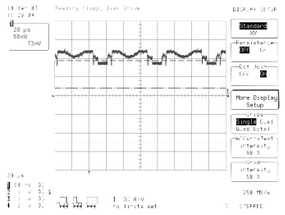
PMV02
PIN20
E5_Y_OUT

⑧



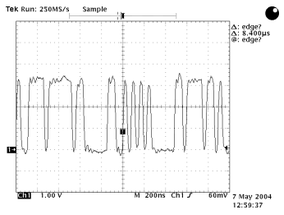
PMV02
PIN22
E5_C_OUT

⑨



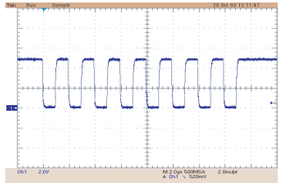
PM02
PIN28
E5_R/Pr_OUT

⑲



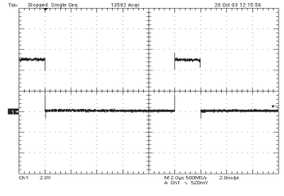
IC1501
PIN87
VI_D1

⑳



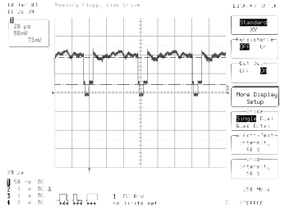
PMV01
PIN3
SPI_CLK

㉑



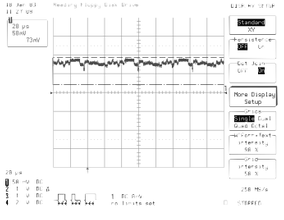
PMV01
PIN5
SPI_MISO

⑩



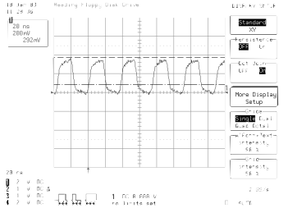
PMV02
PIN24
E5_G/Y_OUT

⑪



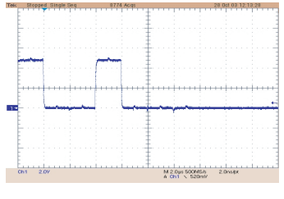
PMV02
PIN26
E5_B/Pb_OUT

⑫



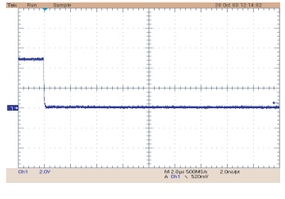
PMH01
PIN9
VO_CLK

㉒



PMV01
PIN4
SPI_MOSI

㉓



PMV01
PIN6
SPI_CS

• CIRCUIT VOLTAGE CHART

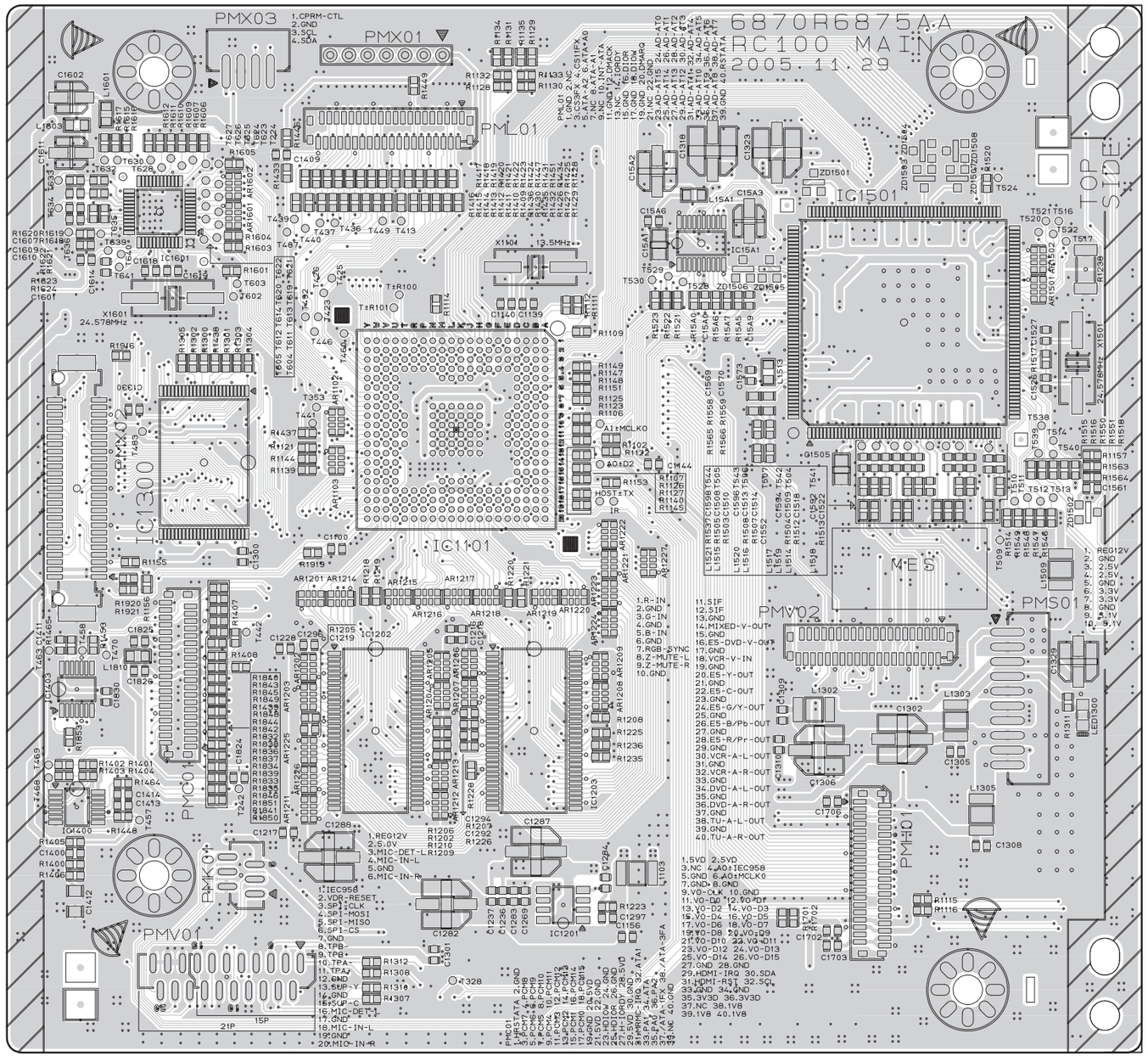
MODE / PIN NO.	EE	PB	REC
IC1201			
1	0	0	0
2	0	0	0
3	1.02	1.02	1.23
4	1.02	1.01	1.23
5	2.37	2.48	2.47
6	2.34	2.48	2.47
7	2.34	2.48	2.47
8	1.08	1.22	1.22
IC1301			
1	0	0	0
2	3.14	3.29	3.27
3	4.88	4.96	4.96
4	0	0	0
5	0	0	0
6	4.88	0.01	0.01
7	0	0	0
8	4.94	3.97	3.97
9	3.22	2.64	2.64
10	0	0	0
11	4.88	4.2	4.2
12	4.96	4.3	4.3
13	0	0	0
14	4.84	4.97	4.97
IC1400			
1	3.14	3.29	3.29
2	3.14	3.32	3.32
3	3.14	3.29	3.29
4	0.04	0.04	0
5	0	0.04	0
6	0	0	0
7	0	0	0
8	3.14	3.29	3.29
9	3.14	5.09	5.09
10	3.14	3.29	3.29
11	3.14	3.29	3.29
12	4.98	5.09	5.09
13	3.14	3.29	3.29
14	3.14	3.29	3.29
IC1402			
1	0	0	0
2	0	0.04	0.04
3	0	0.04	0.04
4	0	0	0
5	0	3.29	3.29
6	0	3.29	3.29
7	3.14	3.29	3.29
8	0	0.04	0.04
9	0	0.04	0.04
10	0	0	0
11	0	0.04	0.04
12	0	0.04	0.04
13	0	0.04	0.04
14	0	0.04	0.04
15	0	0	0

MODE / PIN NO.	EE	PB	REC
16	0	0.04	0.04
17	0	0.04	0.04
18	0	3.29	3.29
19	0	0.04	0.04
20	0	0.04	0.04
21	0	0	0
22	0	0.04	0.04
23	0	3.29	3.29
24	0	0	0
25	0	0.01	0.01
26	0	0	0
27	0	0	0
28	0	0	0
29	0	3.29	3.29
30	0	0	0
31	0	3.29	3.29
32	0	0	0
33	0	0	0
34	0	0	0
35	0	0	0
36	0	0	0
37	0	0	0
38	0	0	0
39	0	0	0
40	0	0	0
41	0	0	0
42	3.16	3.29	3.29
43	0	0	0
44	0	0	0
45	0	0	0
46	0	0	0
47	0	0	0
48	0	0	0
IC1601			
1	2.64	2.64	1.62
2	3.42	3.52	1.06
3	3.42	3.48	0.01
4	3.54	3.58	0.5
5	3.56	3.62	0.5
6	0	0	0.02
7	0	0	0.02
8	0	0	0.02
9	0	0	0.02
10	0	0	0.02
11	0	0	0.02
12	0	0	0
13	3.26	3.27	3.26
14	0	0	0
15	0	0	0
16	0	0	0
17	0	0	0
18	0	0	0
19	3.04	3.24	3.23
20	3.04	3.26	3.11
21	3.04	3.26	3.26

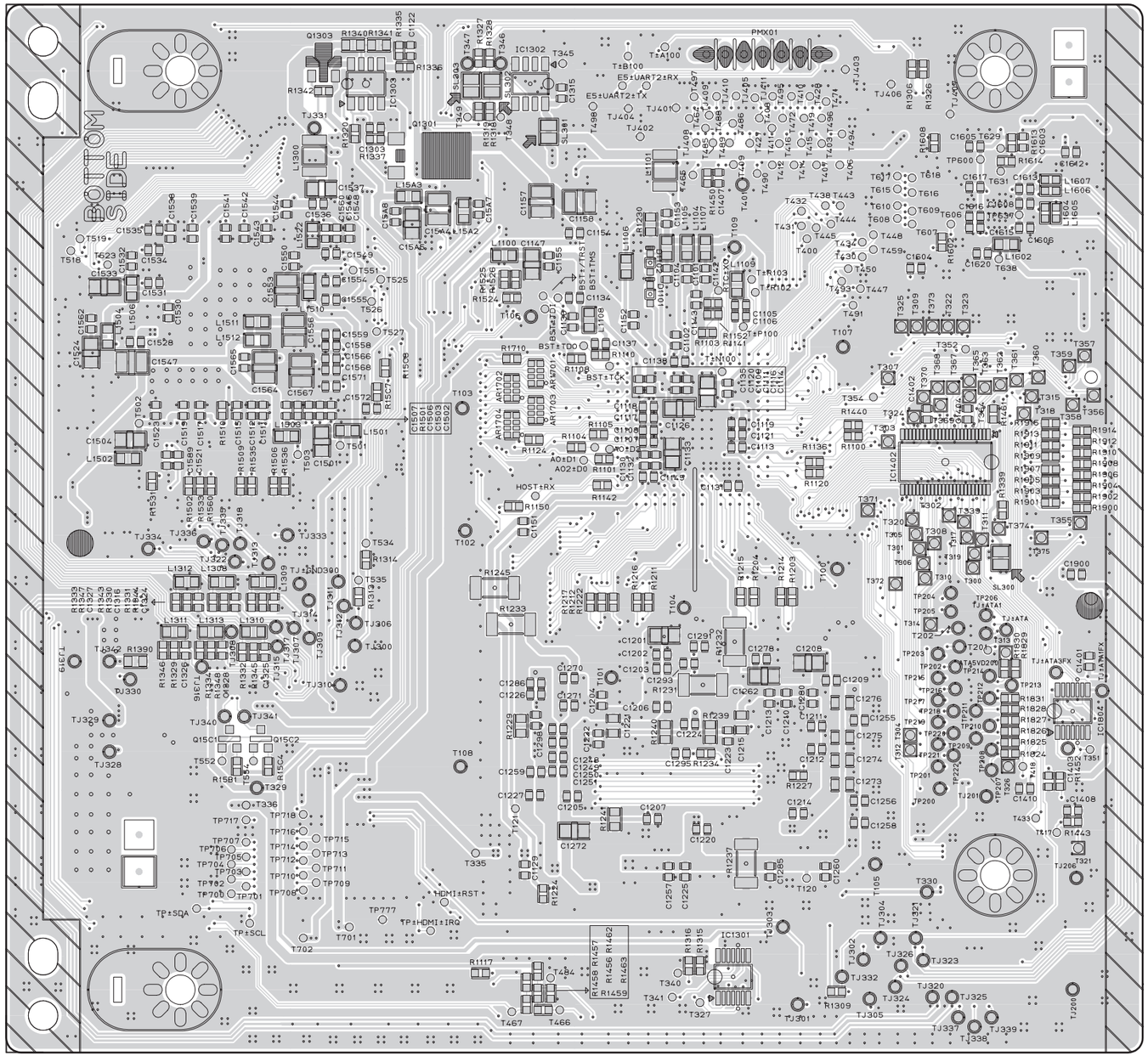
MODE / PIN NO.	EE	PB	REC
22	3.04	3.2	3.25
23	0	0	0
24	0	0	0
25	3.24	3.24	3.26
26	0	0	0
27	0	0	1.83
28	0	0	1.83
29	3.12	3.08	1.81
30	3.12	3.12	1.81
31	3.12	3.08	1.82
32	0	0	0
33	0	0	0
34	1.34	1.22	1.21
35	3.24	1.22	3.26
36	0	0	0
37	3.24	3.1	3.26
38	0	1.48	0
39	1.34	3.22	1.4
40	3.28	3.28	3.26
41	0	3.22	0
42	1.48	1.48	1.49
43	1.48	1.48	1.49
44	2.96	3.24	3.26
45	3.24	3.24	3.26
46	0	0	0
47	0	0	0
48	2.88	2.88	0

PRINTED CIRCUIT DIAGRAMS

1. VDR P.C.BOARD(TOP VIEW)



2. VDR P.C.BOARD (BOTTOM VIEW)



SECTION 4 MECHANISM OF VCR PART(D-37)

CONTENTS

DECK MECHANISM PARTS LOCATIONS

• Top View.....4-1
• Bottom View 4-1

DISASSEMBLY AND ASSEMBLY OF DECK MECHANISM

1.Disassembly of Drum assembly.....4-2
2.Disassembly of Plate top disassembly..... 4-4
3.Holder Assembly CST.....4-4
4.Disassembly of Gear Assembly Rack F/L.....4-4
5.Opener Door 4-4
6.Arm Assembly F/L.....4-4
7.Lever Assembly S/W.....4-4
8.Motor Assembly L/D.....4-5
9.Gear Wheel.....4-5
10.Arm Assembly Cleaner.....4-5
11. Head F/E.....4-5
12.Base Assembly A/C Head.....4-5
13.Brake Assembly T 4-6
14.Arm Assembly Tension.....4-6
15.Reel S / Reel T.....4-6
16.Base Assembly P4 4-7
17.Opener Lid 4-7
18.Arm Assembly Pinch 4-7
19.Arm T/up 4-7
20.Supporter, Capstan 4-8
21.Belt Capstan/Motor Capstan.....4-8
22.Lever F/R 4-8
23.Clutch Assembly D37.....4-8
24.Gear Drive/Gear Cam 4-9
25.Gear Sector.....4-9
26.Brake Assembly Capstan.....4-9
27.Plate Slider.....4-9
28.Lever Tension.....4-9
29.Lever Spring.....4-9
30. Lever Brake.....4-9
31.Gear Assembly P2/Gear Assembly P3 ...4-10
32.Base Assembly P2/Base Assembly P3...4-10
33.Base Loading 4-10
34.Base Tension.....4-11
35.Arm Assembly Idler Jog 4-11

DECK MECHANISM ADJUSTMENT

• Fixtures and tools for service 4-12
1. Mechanism Assembly Mode Check 4-13
2. Previous Preparation for Deck Adjustment 4-14
3. Torque Measuring 4-14
4. Guide Roller Height Adjustment.....4-15
4-1. Prior Adjustment.....4-15
4-2. Fine Adjustment 4-15
5. Audio/Control (A/C) Head Adjustment.....4-16
5-1. Prior Adjustment.....4-16
5-2. Tape Path Check between Pinch Roller and Take-up Guide 4-17
5-3. Fine Adjustment (Azimuth Adjustment).....4-17
6. X-distance Adjustment 4-17
7. Adjustment after Drum Assembly (Video Heads) 4-18
8. Tachometer Adjustment of Deck Assembly.....4-18
8-1. Check of Audio, RF Normalization Time (Locking Time) in Play after CUE or REV.....4-18
8-2. Check of Tape Curl and Jam Status.....4-18

PROTECTION, MAINTENANCE AND CHECK OF VIDEO FUNCTION

1. Checking Points before Repair 4-19
2. Essential Check and Repair.....4-20
3. Regular Check and Repair.....4-20
4. Tools for Check and Repair.....4-20
5. Maintenance Process.....4-20
5-1. Removal of Foreign Materials.....4-20
5-2. Grease Application.....4-21

TROUBLESHOOTING GUIDE

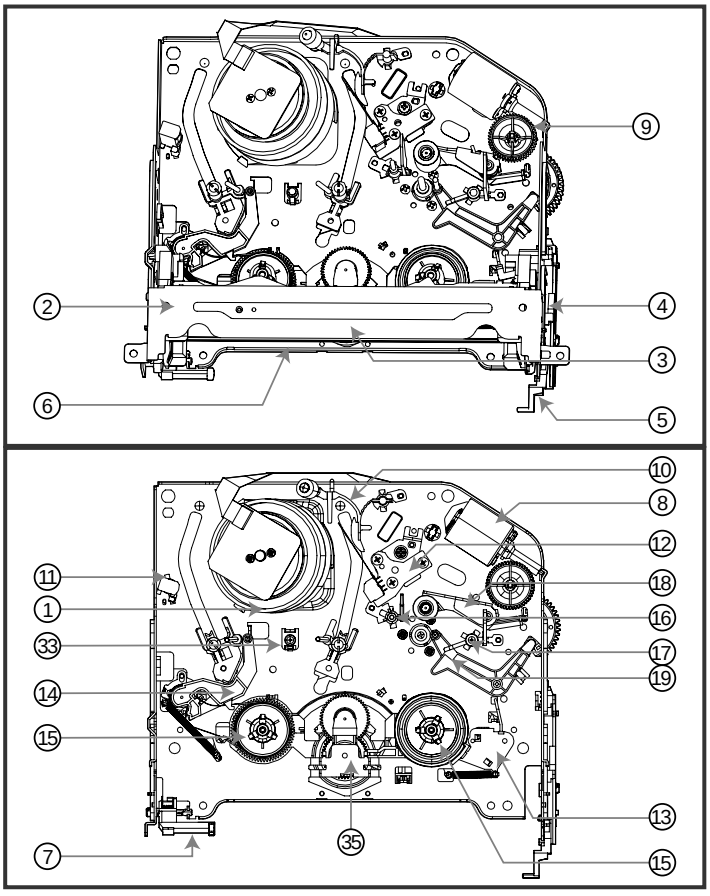
1. Deck Mechanism.....4-23
2. Front Loading Mechanism.....4-26

EXPLODED VIEWS

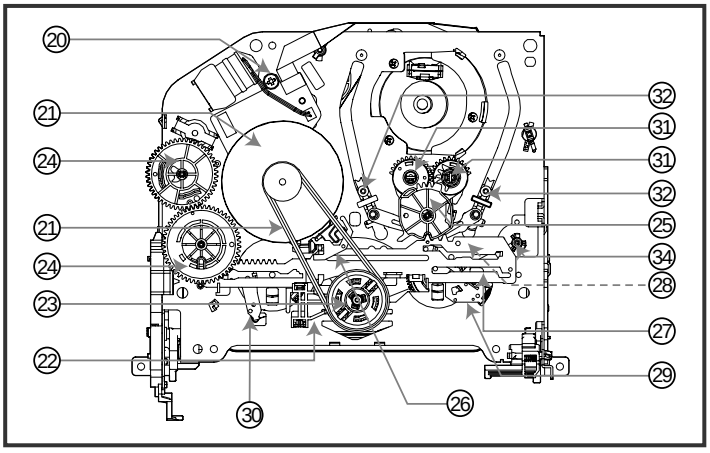
1. Front Loading Mechanism Section.....4-28
2. Moving Mechanism Section(1).....4-29
3. Moving Mechanism Section(2).....4-30

DECK MECHANISM PARTS LOCATIONS

• Top View



• Bottom View



NOTE : When reassembling, perform the procedure in the reverse order.

(1) When reassembling, confirm Mechanism and Mode Switch Alignment Position

(2) When disassembling, the Parts in the "Starting No." column should be removed first."

Procedure / Starting No.		Part	Fixing Type	Ref. Drawings	Position
	1	Drum Assembly	3 screws	A-1	T
	2	Plate Top	2 hooks	A-2	T
2	3	Holder Assembly CST	6 chasses	A-2	T
2,3	4	Gear Assembly Rack F/L	1 hook	A-2	T
2,3,4	5	Opener Door	Chassis Hole	A-2	T
2,3,4,5	6	Arm Assembly F/L	Chassis Hole	A-2	T
	7	Lever Assembly S/W	Chassis Hole, 1 hook	A-2	T
	8	Motor Assembly L/D	1 screw	A-3	T
	9	Gear Wheel	2 hooks	A-3	T
	10	Arm Assembly Cleaner	Chassis Embossing	A-3	T
	11	Head F/E	Chassis Embossing	A-3	T
	12	Base Assembly A/C Head	1 screw	A-3	T
2,3	13	Brake Assembly T	1 hook	A-4	T
2,3	14	Arm Assembly Tension	1 hook	A-4	T
2,3,13,14	15	Reel S / Reel T	Shaft	A-4	T
	16	Base Assembly P4	Chassis Embossing	A-5	T
	17	Opener Lid	Chassis Embossing	A-5	T
17	18	Arm Assembly Pinch	Shaft	A-5	T
17	19	Arm T/up	1 hook	A-5	T
	20	Supporter, capstan	Chassis Hole	A-6	B
17,18	21	Belt Capstan/Motor Capstan	3 screws	A-6	B
	22	Lever F/R	Locking Tab	A-6	B
21, 22	23	Clutch Assembly D37	Washer	A-6	B
	24	Gear Drive/Gear Cam	Washer/Hook	A-7	B
	25	Gear Sector	Hook	A-7	B
21	26	Brake Assembly Capstan	Chassis Hole	A-7	B
21,22,23, 24,2526	27	Plate Slider	Chassis Guide	A-7	B
21,22,23, 24,2526,27	28	Lever Tension	1 Hook	A7	B
21,22,23, 24,2526,27	29	Lever Spring	1 Hook	A-7	B
21,22,23, 24,2526,27	30	Lever Brake	1 Hook	A-7	B
25	31	Gear Assembly P2/ Gear Assembly P3	Bass	A-8	B
2, 3, 14, 25, 31	32	Base Assembly P2 /Base Assembly P3	6 Chasses	A-8	B
25, 31	33	Base Loading	3 Hooks	A-8	B
2,3,14	34	Base Tension	Chassis Embossing	A-9	T
	35	Arm Assembly Idler Jog	Locking Tab	A-9	T

T:Top, B:Bottom

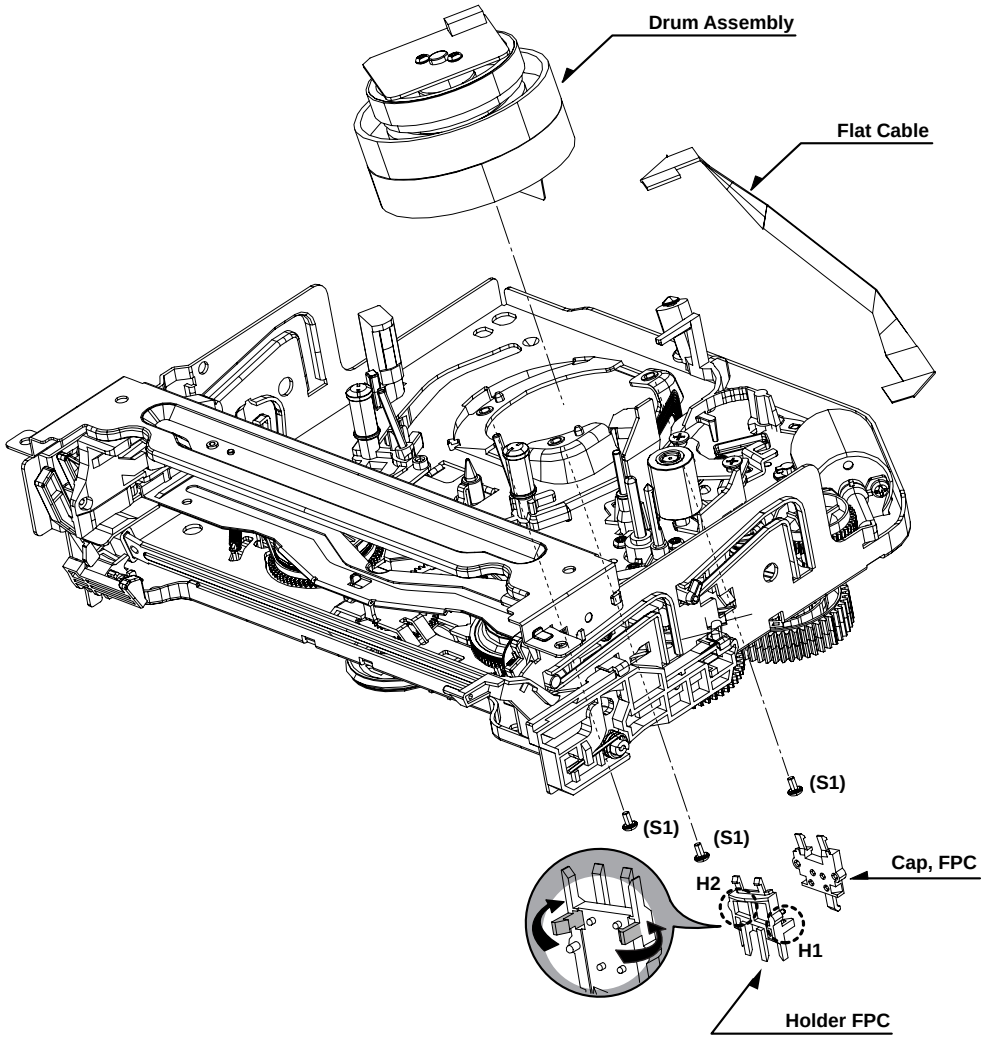
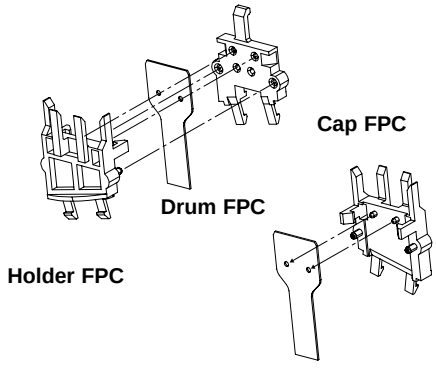


Fig. A-1

1. Disassembly of Drum Assembly (Figure A-1)

1) Separate the flat cable from the Drum FPC and the Capstan Motor.
2) Release 3 screws (S1) on the bottom side of the chassis, and separate the drum assembly.
3) Release the hooks (H1, H2) and separate both the holder FPC and the Cap FPC (disassemble if necessary).

Cautions in assembly of FPC



Assembly shape seen in the reverse direction

DISASSEMBLY AND ASSEMBLY OF DECK MECHANISM

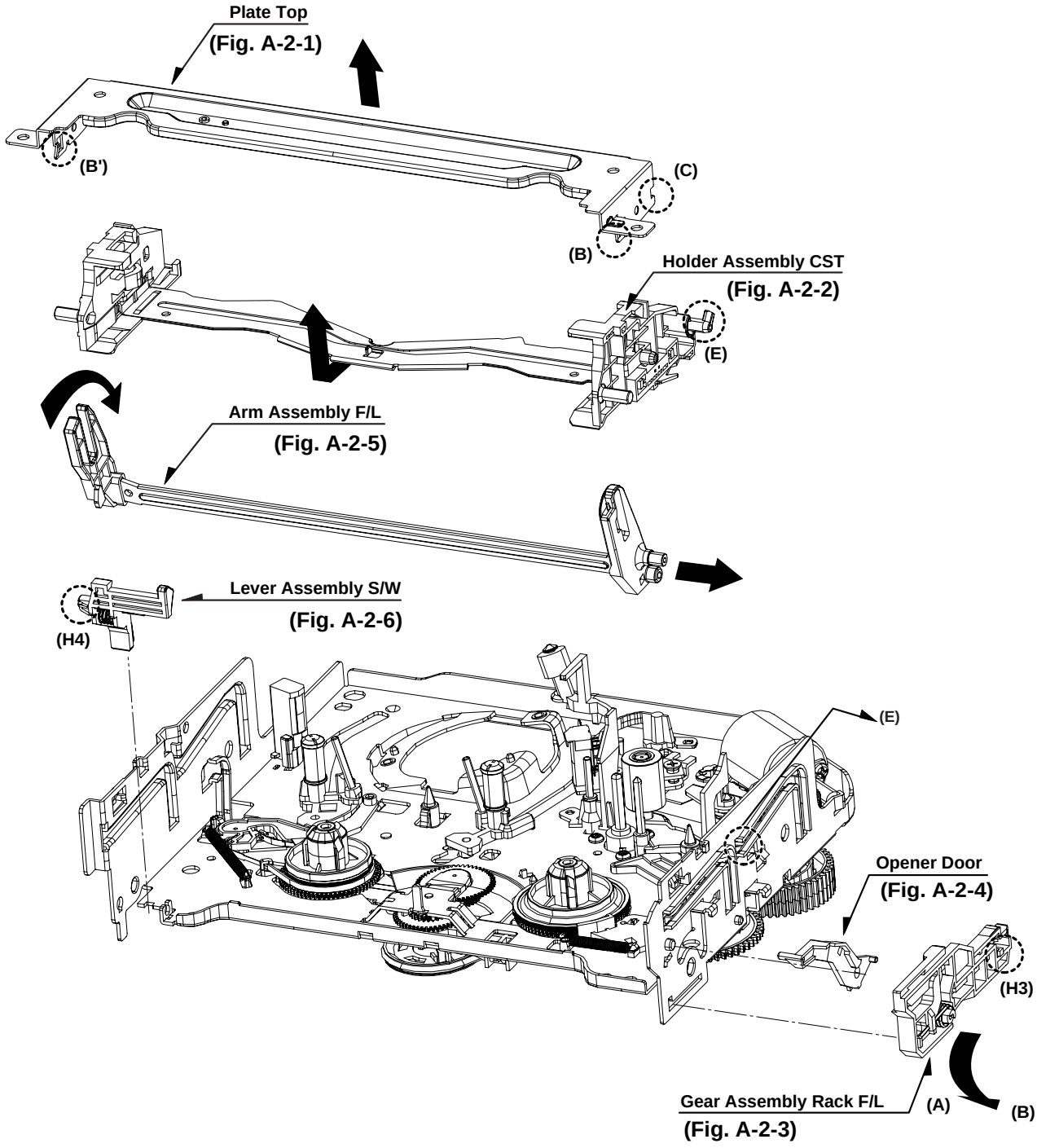


Fig. A-2

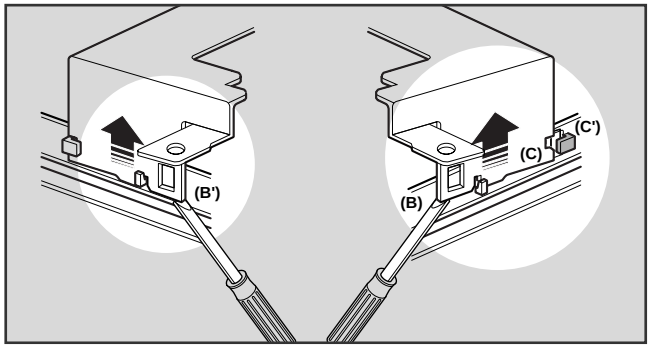
DISASSEMBLY AND ASSEMBLY OF DECK MECHANISM

2. Disassembly of Plate Top (Fig. A-2-1)

1) Separate the right part while leaning back the (B) part of the plate top toward the arrow direction.
2) Separate the left part while leaning back the (B') part of the plate top toward the arrow direction.
   (Tool used: Tool such as (-) driver, auger, etc with pointed or flat end)

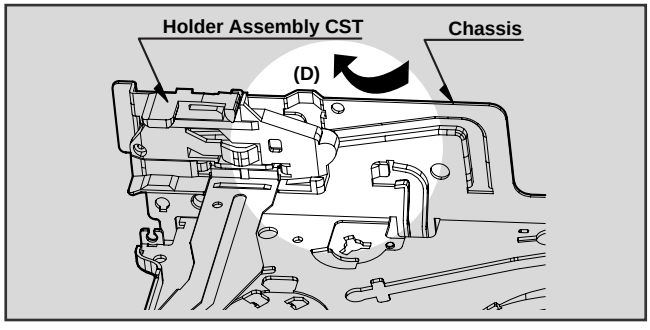
CAUTIONS

Assemble while pressing the (C), (C') part after corresponding them as in drawing.



3. Holder Assembly CST (Fig. A-2-2)

1) Firstly separate the left part from the groove on the (D) part of chassis while moving the holder assembly CST toward the arrow direction.



2) Separate the right part from each groove of chassis

CAUTIONS

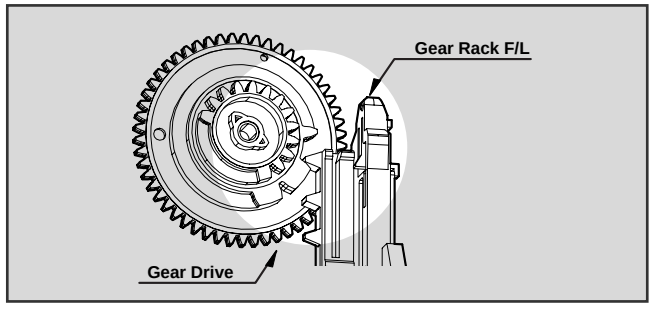
Assemble by inserting the left part after firstly inserting the (E) part of the holder assembly CST into the groove on the (E') part of chassis.

4. Disassembly of Gear Assembly Rack F/L (Fig. A-2-3)

1) Separate the hook (H3) while leaning ahead the hook (3) after moving the gear assembly rack F/L toward the arrow (A) direction.
2) Separate the gear assembly rack F/L toward the arrow (B) direction.

CAUTIONS

For the assembly, correspond the gear part of gear assembly rack F/L to the gear drive.



5. Opener Door (Fig. A-2-4)

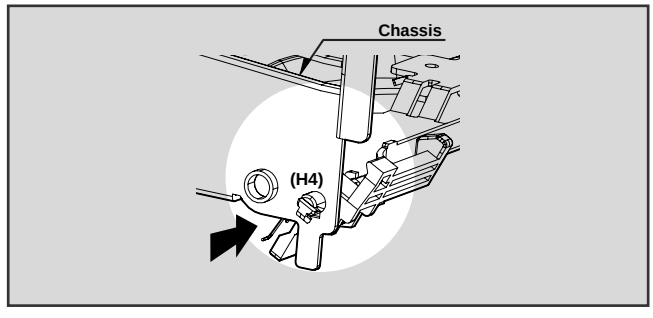
1) Separate the opener door ahead from the guide hole of chassis while turning it clockwise.

6. Arm Assembly F/L (Fig. A-2-5)

1) Firstly separate the left part of the arm assembly F/L from the groove of chassis while pushing the arm assembly F/L toward the arrow direction.
2) Separate the right part from the groove of chassis.).

7. Lever Assembly S/W (Fig. A-2-6)

1) Separate the lever assembly S/W while pushing it toward the arrow direction after removing the hook (4) on the left side of chassis.



DISASSEMBLY AND ASSEMBLY OF DECK MECHANISM

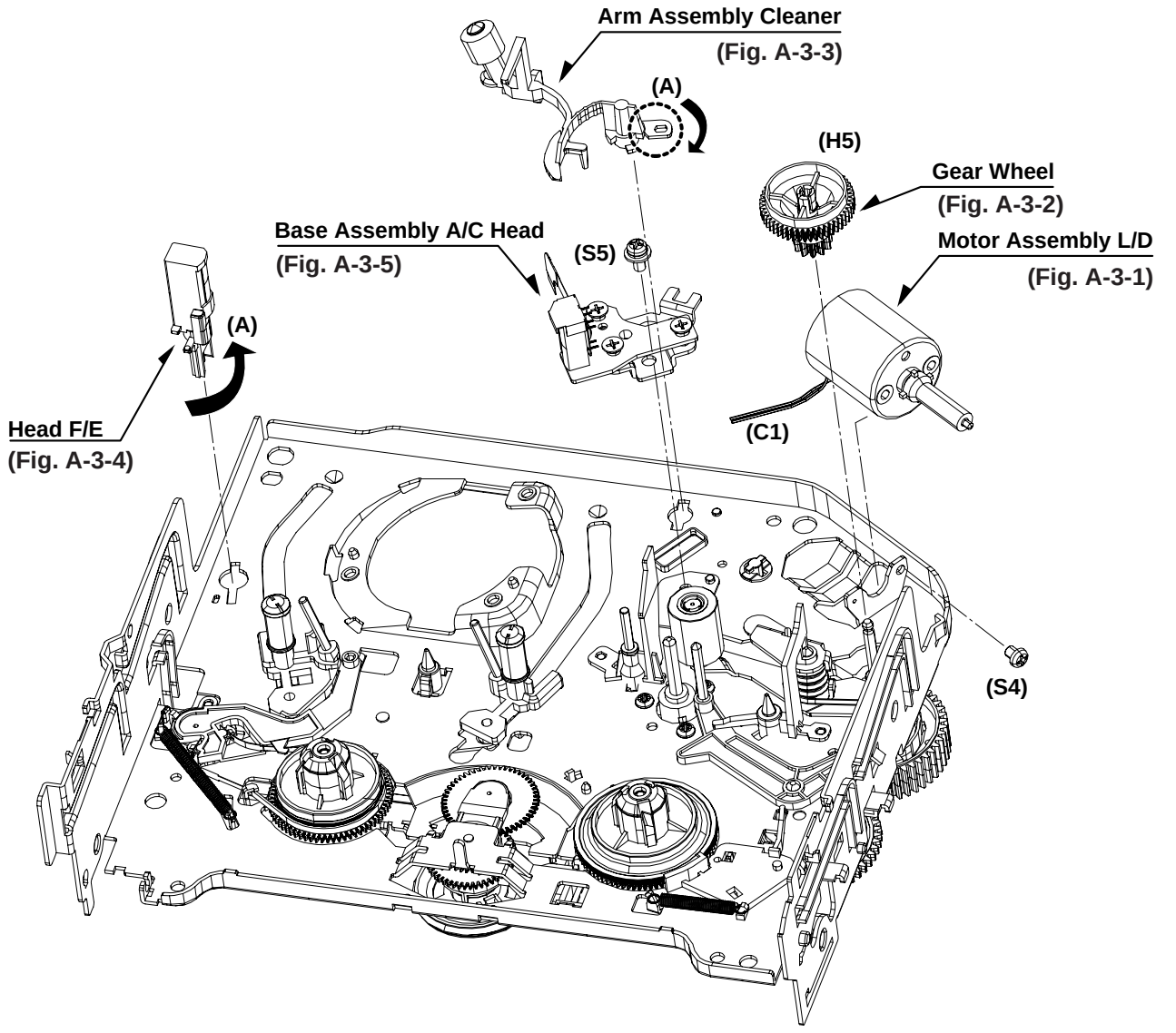


Fig. A-3

8. Motor Assembly L/D (Fig. A-3-1)

1) Take the connector (C1) connected to the Capstan motor PCB out.
2) Remove a screw (S4) of the chassis (S4) and step backward, and disassemble it while holding it up.

9. Gear Wheel (Fig. A-3-2)

1) Release the hook (H5) of the gear wheel and disassemble it upward.

10. Arm Assembly Cleaner (Fig. A-3-3)

1) Separate the (A) part of Fig. A-3-1 from the embossing of chassis, and hold it up while turning it anti-clockwise.

11. Head F/E (Fig. A-3-4)

1) Separate the (A) part of the head F/E from the embossing of chassis, and hold it up while turning it anti-clockwise.

12. Base Assembly A/C Head (Fig. A-3-5)

1) Release a screw (S5) and disassemble while holding it up.

DISASSEMBLY AND ASSEMBLY OF DECK MECHANISM

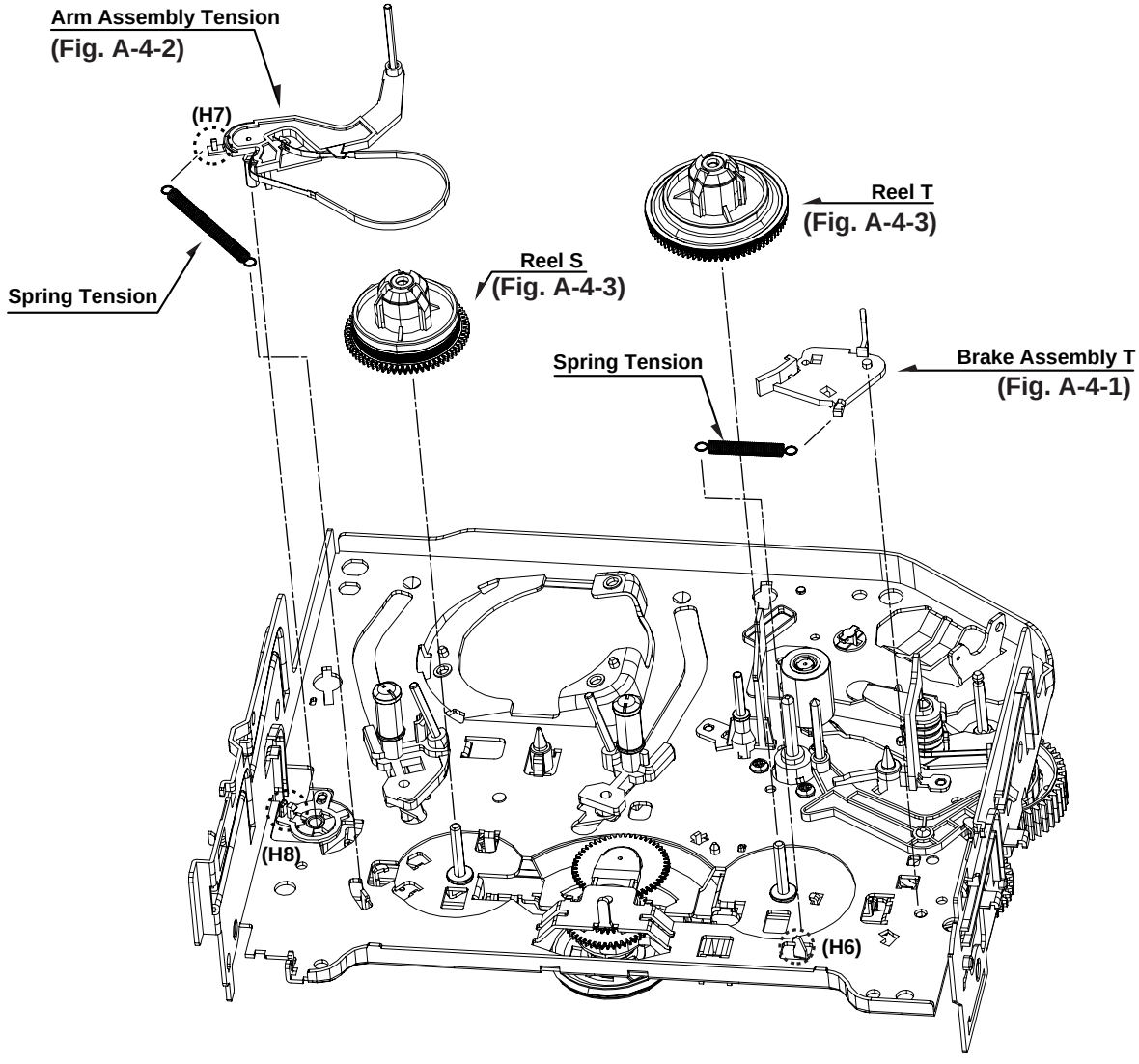


Fig. A-4

13. Brake Assembly T (Fig. A-4-1)

1) Release the spring tension from the lever spring hook (H6).
2) Disassemble the brake assembly T while holding it upward.

14. Arm Assembly Tension (Fig. A-4-2)

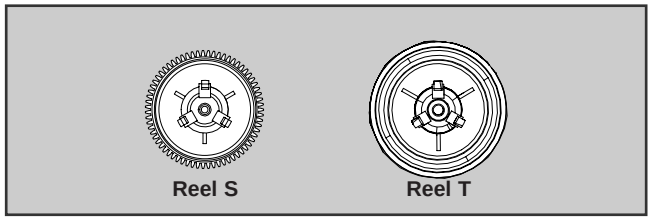
1) Release the spring tension the hook (H7) from the arm assembly tension.
2) After releasing the hook (H8) of the base tension, separate it while holding it up.

CAUTIONS

Spring used for both brake assembly T and arm assembly tension is used (2EA used).

15. Reel S/Reel T (Fig. A-4-3)

1) Disassemble the reel S/ reel T while holding it up (comparison between Reel S and Reel T)



DISASSEMBLY AND ASSEMBLY OF DECK MECHANISM

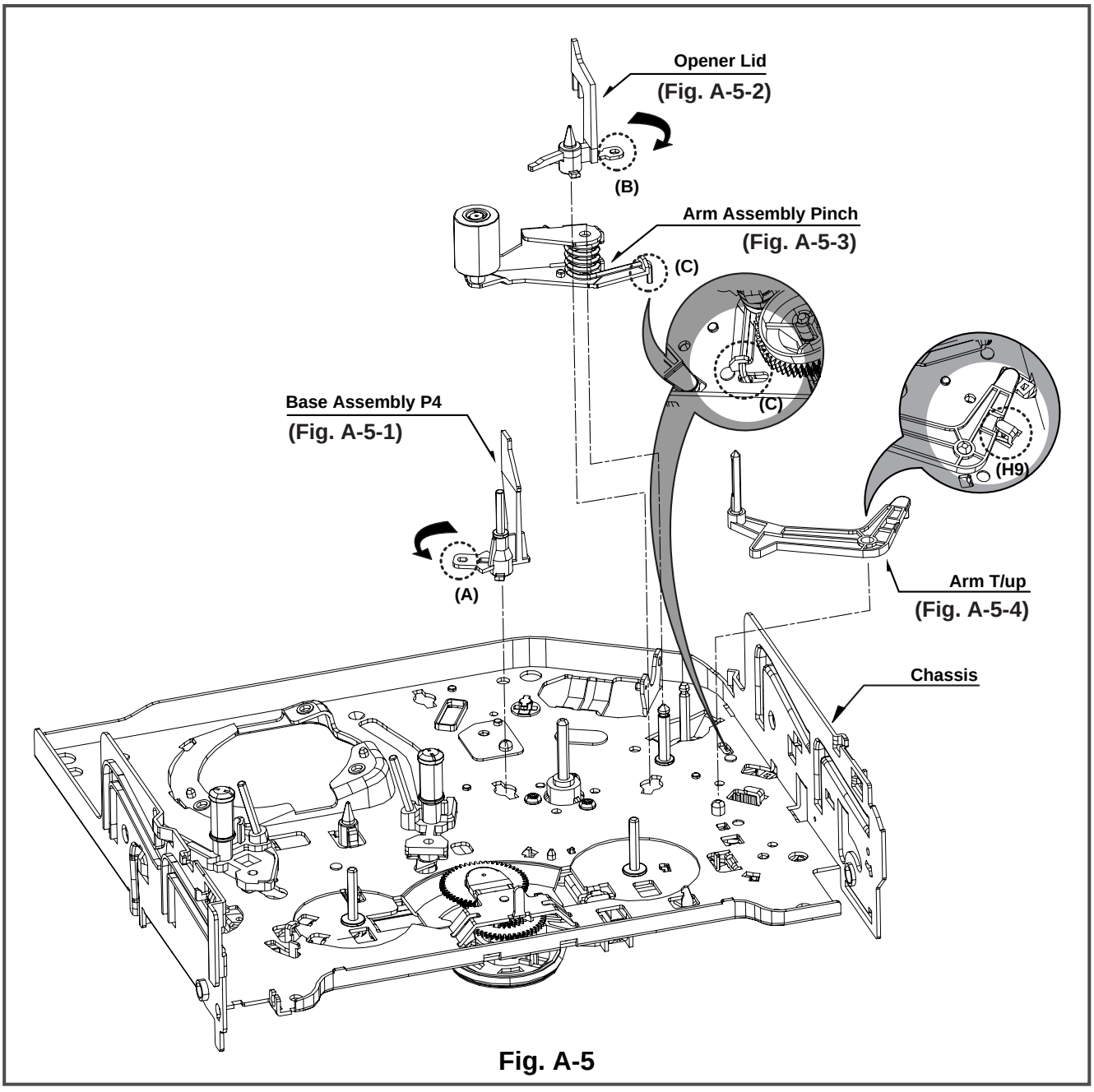


Fig. A-5

16. Base Assembly P4 (Fig. A-5-1)

1) Release the (A) part of the base assembly P4 from the embossing of chassis.
2) Hold the base assembly P4 up while turning it anti-clockwise.

17. Opener Lid (Fig. A-5-2)

1) Release the (B) part of the opener lid from the embossing of chassis.
2) Disassemble the opener lid upward while turning it anti-clockwise.

18. Arm Assembly Pinch (Fig. A-5-3)

1) Hold the arm assembly pinch up.

19. Arm T/up (Fig. A-5-4)

1) Turn the arm T/up to release the anchor jaw (H9) part of chassis and then hold it upward.

CAUTIONS

For the assembly, check the (C) part of the arm assembly pinch is assembled as in drawing.

- REVERSE THE MECHANISM.

DISASSEMBLY AND ASSEMBLY OF DECK MECHANISM

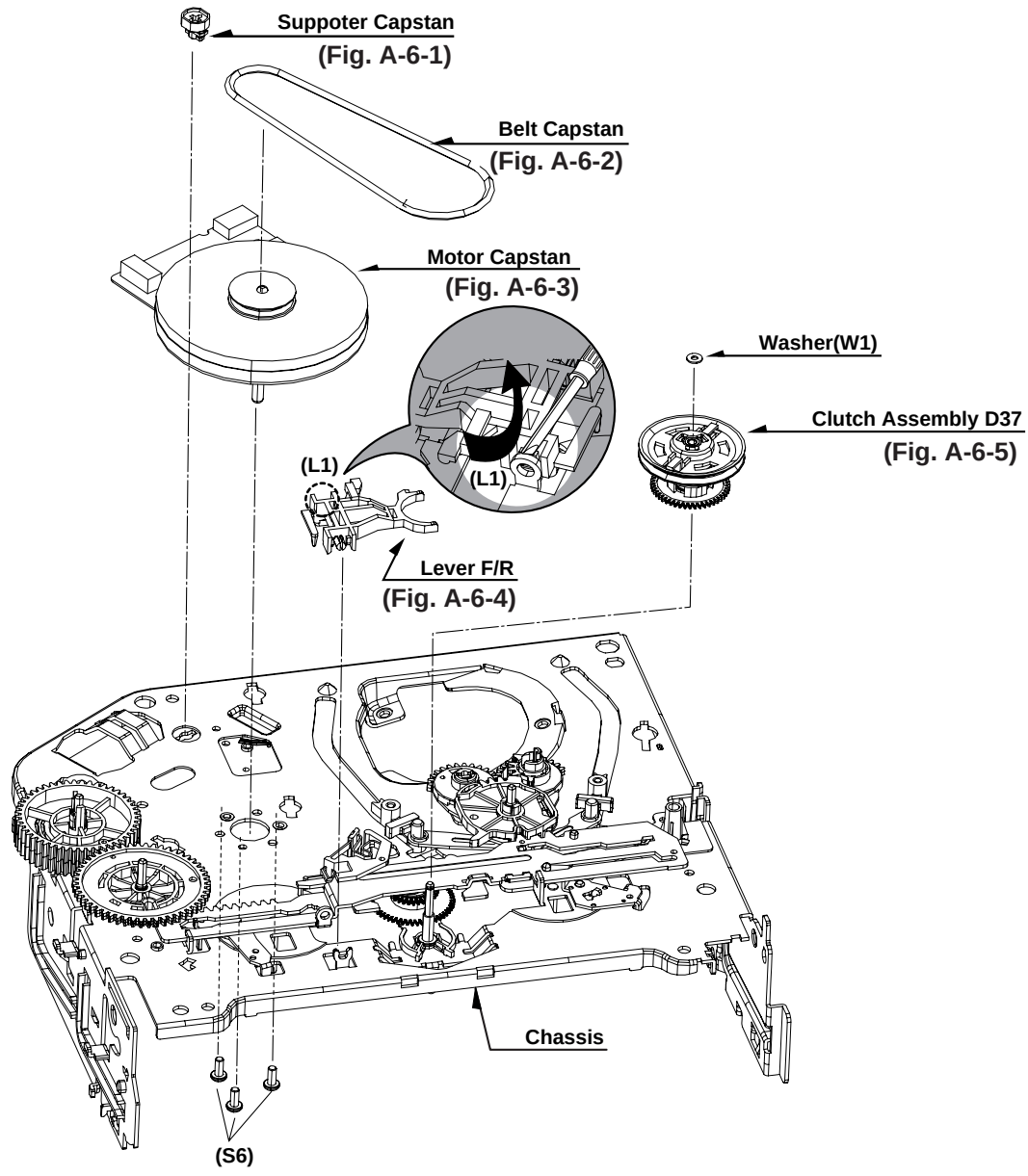


Fig. A-6

20. Supporter, Capstan (Fig. A-6-1)

1) Turn the supporter and Capstan by 90 deg. clockwise with a driver for disassembly.

21. Belt Capstan (Fig. A-6-2) / Motor Capstan (Fig. A-6-3)

1) Separate the belt Capstan.
2) Undo 3 screws (S6) on the bottom side of chassis and disassemble it upward.

22. Lever F/R (Fig. A-6-4)

1) Release the locking tab (L1) and then disassemble it upward.

23. Clutch Assembly D37 (Fig. A-6-5)

1) Remove the washer (W1) and then disassemble it upward.

DISASSEMBLY AND ASSEMBLY OF DECK MECHANISM

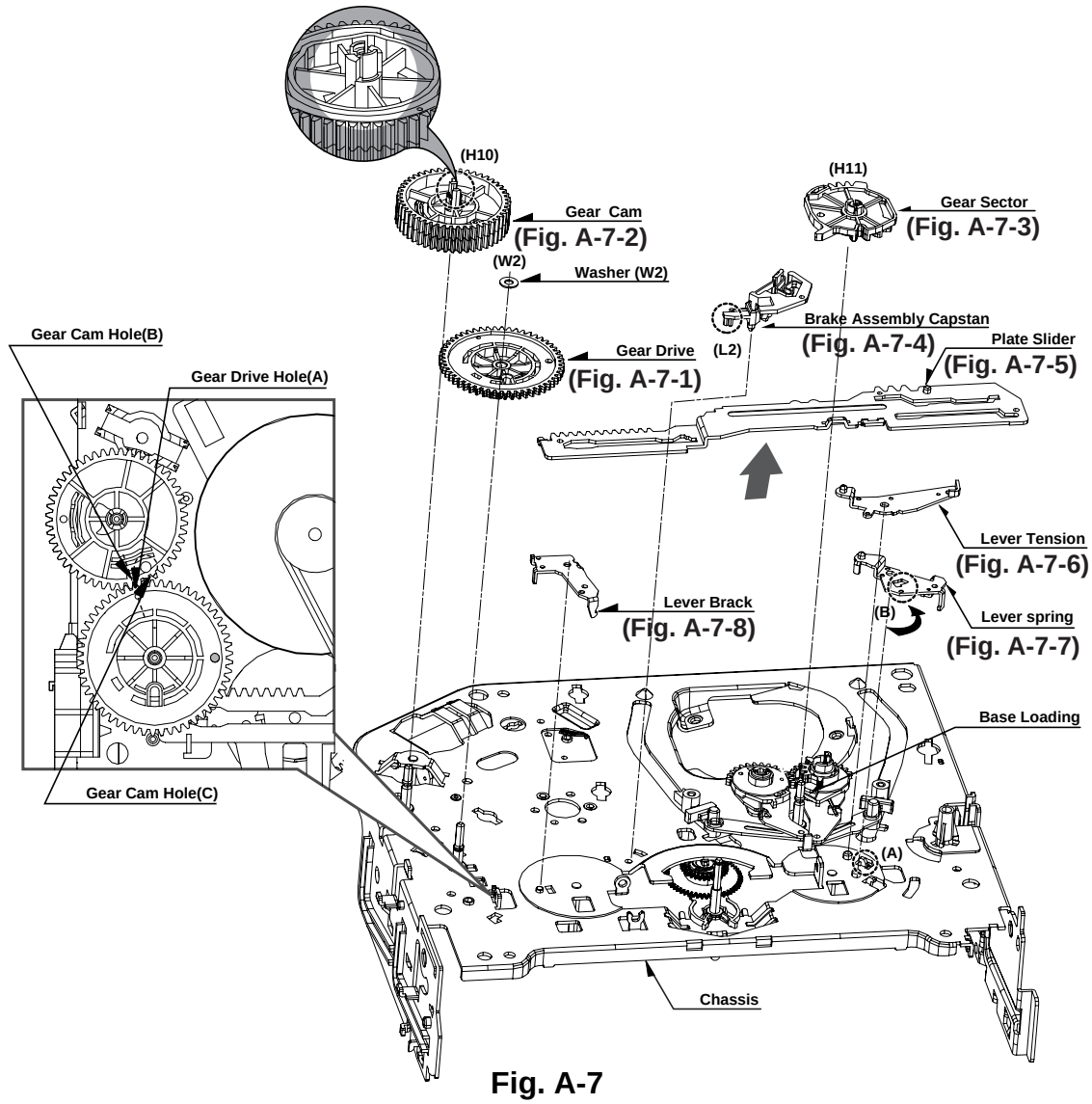


Fig. A-7

24. Gear Drive (Fig. A-7-1)/ Gear Cam (Fig. A-7-2)

1) Remove the washer (W2) and then disassemble the gear drive.
2) Release the hook (H10) of the gear cam and then disassemble it upward.

CAUTIONS

For the assembly, adjust both the gear driver hole (A) and the gear cam hole (B) straightly and then correspond the gear cam hole (C) to the chassis hole.

25. Gear Sector (Fig. A-7-3)

1) Release the hook (H11) of the gear sector and then hold the gear sector upward.

26. Brake Assembly Capstan (Fig. A-7-4)

1) Release the locking tab (L2) on the bottom side of the plate slider and then disassemble it upward.

27. Plate Slider (Fig. A-7-5)

1) Disassemble the plate slider while holding it up.

28. Lever Tension (Fig. A-7-6)

1) Release the lever tension from the guide (A) of chassis while turning it anti-clockwise.
2) Disassemble the lever tension while holding it up.

29. Lever Spring (Fig. A-7-7)

1) Release the (B) part of the lever spring from the guide (A) of chassis while turning it anti-clockwise.
2) Disassemble the lever tension while holding it up.

30. Lever Brake (Fig. A-7-8)

1) Disassemble the lever brake while holding it up.

DECK MECHANISM DISASSEMBLY

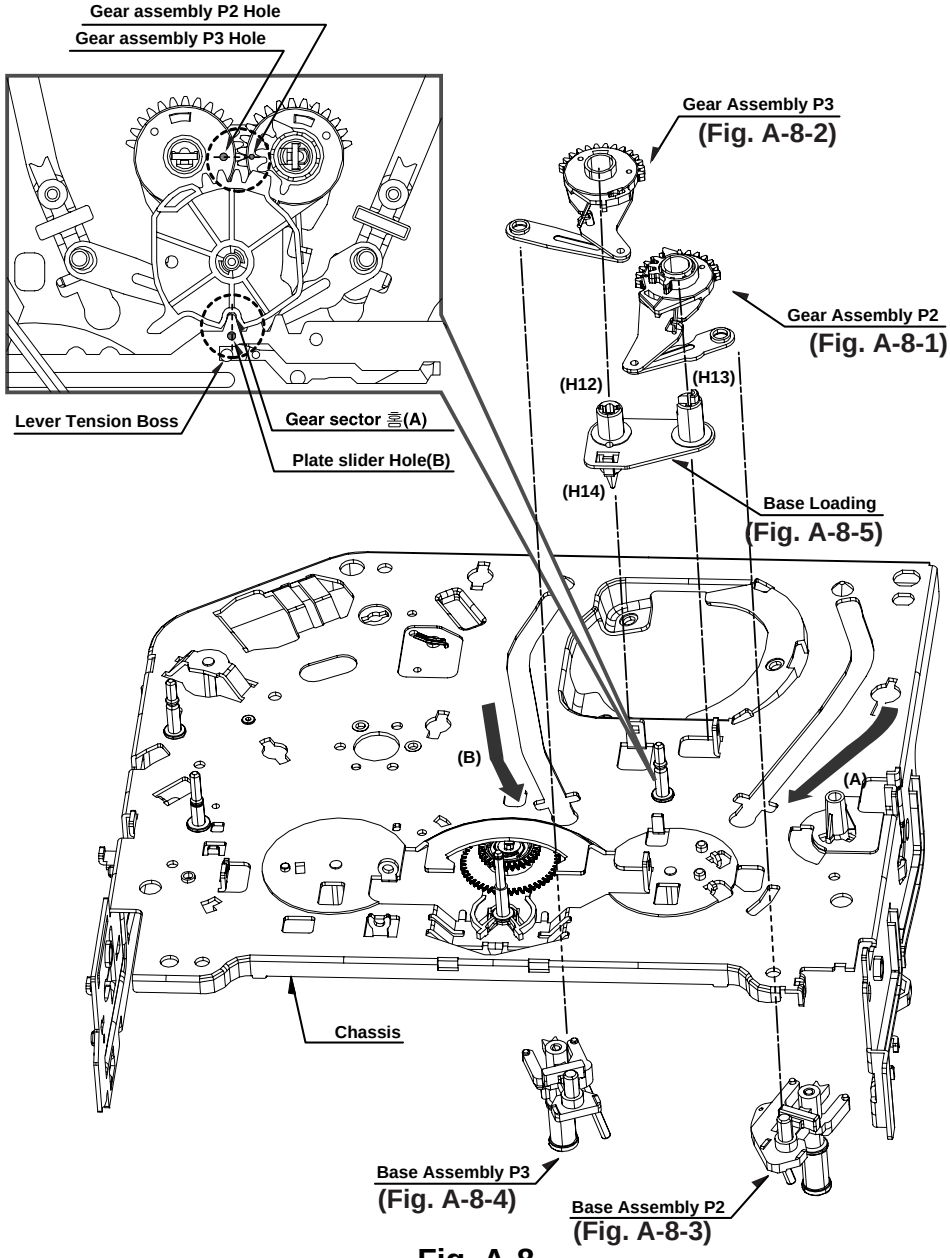


Fig. A-8

31. Gear Assembly P2 (Fig. A-8-1)/ Gear Assembly P3 (Fig. A-8-2)

1) Hold the gear assembly P2 upward.
2) Hold the gear assembly P3 upward.

CAUTIONS

For the assembly, check the holes of both the gear assembly P2 and the P3 are adjusted straightly, and then correspond the gear section groove (A) to the plate slider hole (B).

32. Base Assembly P2 (Fig. A-8-3)/ Base Assembly P3 (Fig. A-8-4)

1) Disassemble the base assembly P2 downward while moving it toward the arrow (A) direction along with the guide hole of chassis.
2) Disassemble the base assembly P2 downward while moving it toward the arrow (B) direction along with the guide hole of chassis.

33. Base Loading (Fig. A-8-5)

1) Release 3 hooks (H12, 13, 14) of the base loading, and then disassemble them upward.
   - Reverse the mechanism.

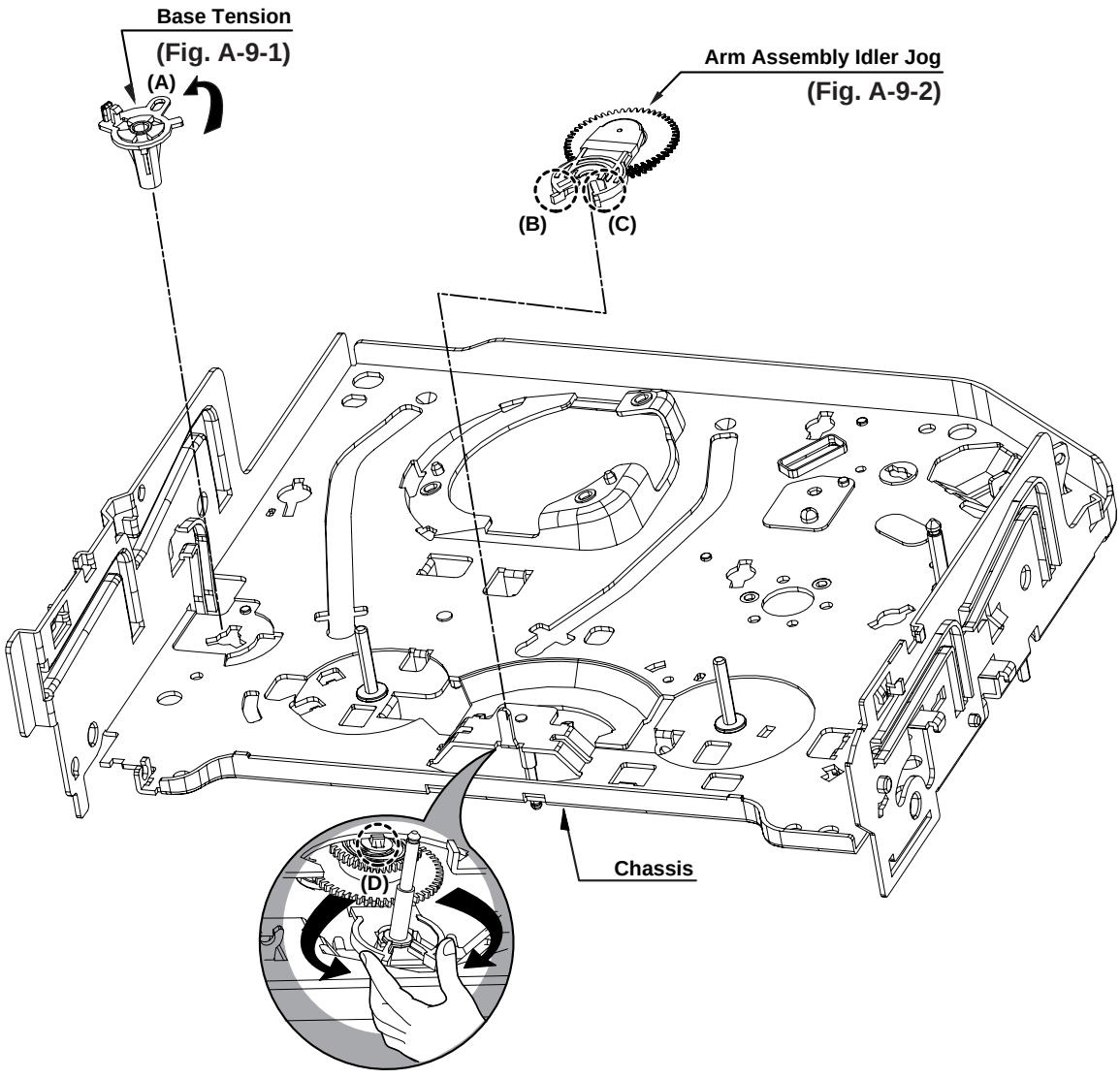


Fig. A-9

34. Base Tension (Fig. A-9-1)

1) Release the (A) part of the base tension from the embossing of chassis.
2) Hold the base tension upward while turning it anti-clockwise.

35. Arm assembly Idler Jog (Fig. A-9-2)

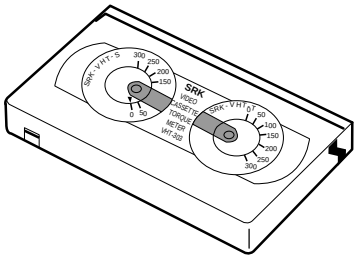
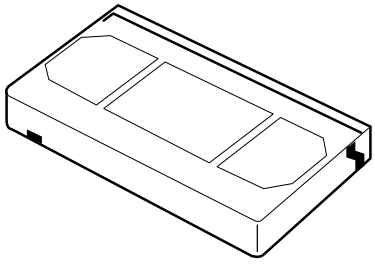
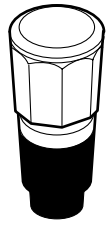
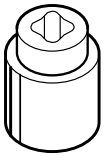
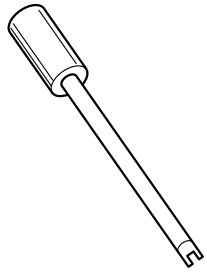
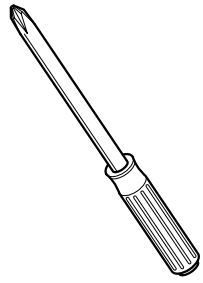
1) Push both (B), (C) parts in Fig. A-9-2 toward the arrow direction.
2) Disassemble the arm assembly idler upward.

CAUTIONS

Take care to ensure that the (D) part in the drawing is not hung to chassis in disassembly.

DECK MECHANISM ADJUSTMENT

• Fixtures and Tools for Service

1. Cassette Torque Meter **SRK-VHT-303(Not SVC part)** **Part No:D00-D006** 	**2. Alignment tape** **Part No NTSC:DTN-0001** **PAL:DTN-0002** 	**3. Torque gauge** **600g.Cm ATG** **Part No:D00-D002** 
4. Torque gauge adaptor **Part No:D09-R001** 	**5. Post height adjusting driver** **Part No:DTL-0005** 	**6. + Type driver (ø5)** 

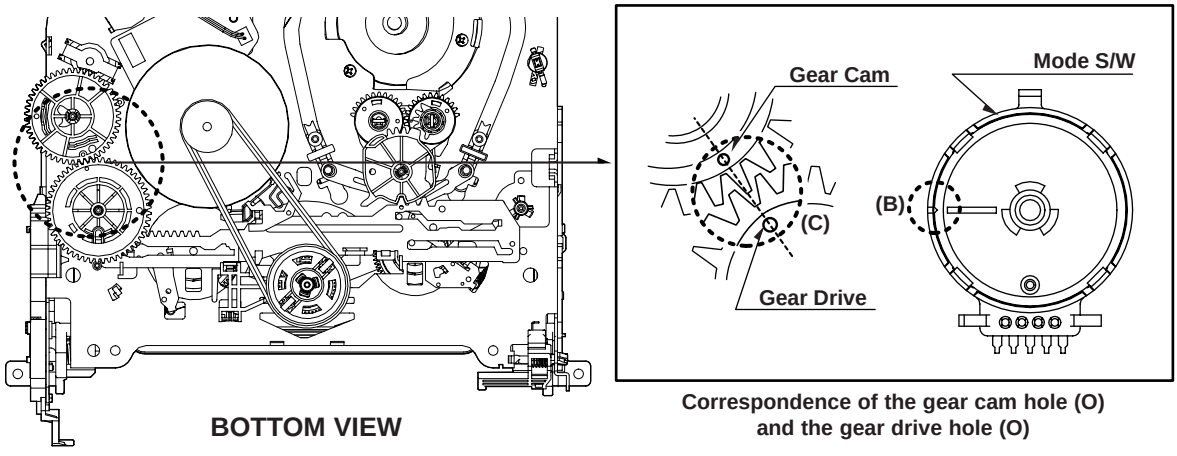
DECK MECHANISM ADJUSTMENT

1. Mechanism Assembly Mode Check

Purpose of adjustment : To make tools normally operate by positioning tools accurately.		
Fixtures and tools used	**VCR (VCP) status**	**Checking Position**
• Blank Tape (empty tape)	• Eject Mode (with cassette withdrawn)	• Mechanism and Mode Switch

1) Turn the VCR on and take the tape out by pressing the eject button.
2) Separate both top cover and plate top, and check both the hole (A) of gear cam and the hole (A') of chassis correspond (Fig. C-2).
3) If it is done as in the paragraph 2): Turn the gear cam as in No.2) after mantling the motor assembly L/D.
4) Undo the screw fixing the deck and the main frame, and separate the deck assembly. Check both the hole (A) of gear cam and the hole (A') of chassis correspond (Fig. C-1).
5) Check the mode S/W on the main P.C. board locates at a proper position as in (B) of the Fig. (C-1).
6) Connect the deck to the main P.C. board and perform all types of test.

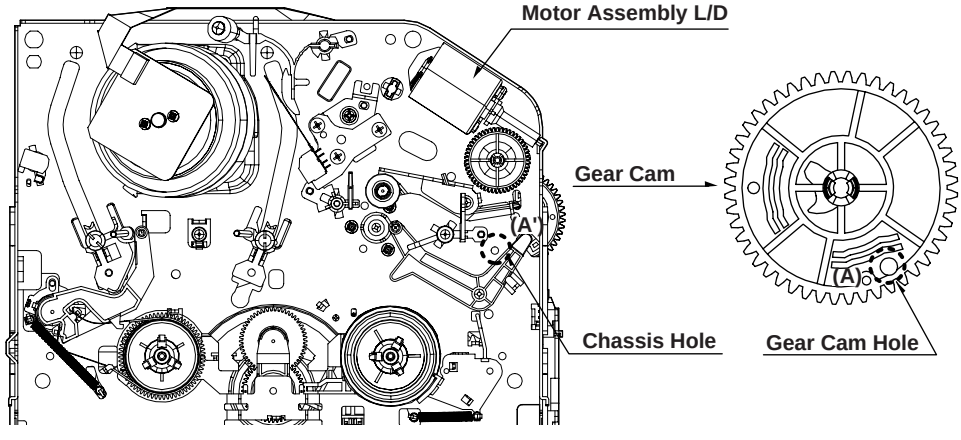
CHECK DIAGRAM



BOTTOM VIEW

Correspondence of the gear cam hole (O) and the gear drive hole (O)

Fig. C-1



TOP VIEW

Fig. C-2

2. Previous Preparation for Deck Adjustment

(Preparation to load the VCR (VCP) with cassette tape not inserted)

1) Take the power cord from the consent.
2) Separate the top cover and the plate assembly top.
3) Insert the power cord into again.
4) Turn the VCR (VCP) on and load the cassette while pushing the lever stopper of the holder assembly CST backward. In this case, clog both holes on the housing rail part of chassis to prevent detection of the end sensor.

If doing so, proceeding to the stop mode is done. In this status, input signals of all modes can be received. However, operation of the Rewind and the Review is impossible since the take-up reel remains at stop status and so cannot detect the reel pulse (however, possible for several seconds).

3. Torque Measuring

Purpose of Measuring : To measure and check the reel torque on the take-up part and the supply part that performs basic operation of the VCR (VCP) for smoothly forwarding the tape.
Measure and check followings when the tape is not smoothly wound or the tape velocity is abnormally proceeded:

Fixtures and tools used	VCR (VCP) status	Measuring method
• Torque Gauge (600 g.cm ATG) • Torque Gauge Adaptor • Cassette Torque Meter SRK-VHT-303	• Play (FF) or Review (REW) Mode	• Try to operate the VCR (VCP) per mode with the tape not inserted (See '2. Prior Preparation for Deck Adjustment). • Measure after adhering and fixing the torque gauge adaptor to the torque gauge (Fig. C-3-1) • Read scale of the supply or take-up part of the cassette torque meter (Fig. C-3-2).

Item	Mode	Instruments	Reel Measured	Measuring Value
Fast forward Torque	Fast Forward	Torque Gauge	Take-Up Reel	More than 400g°cm
Rewind Torque	Rewind	Torque Gauge	Supply Reel	More than 400g°cm
Play Take-Up Torque	Play	VHT-303	Take-Up Reel	40~100g°cm
Review Torque	Review	VHT-303	Supply Reel	120~210g°cm

NOTE

Adhere the torque gauge adaptor to the torque gauge for measuring the value.

• Torque Gauge (600g.cm ATG)

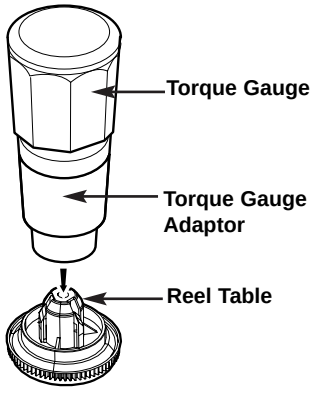


Fig. C-3-1

• Cassette Torque Meter (SRK-VHT-303)

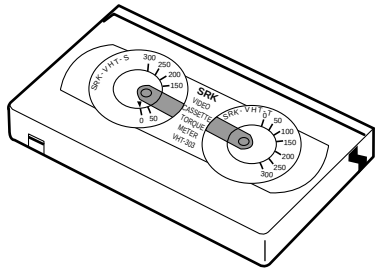


Fig. C-3-2

DECK MECHANISM ADJUSTMENT

4. Guide Roller Height Adjustment

Purpose of adjustment : To ensure that the bottom surface of the tape can travel along with the tape lead line of the lower drum by constantly and adjusting and maintaining the height of the tape.

4-1. Prior Adjustment

Fixtures and tools used	VCR (VCP) status	Adjustment position
• Post Height Adjusting Driver	• Play or Review Mode	• The guide roller height adjusting screw on the supply guide roller and the take-up guide roller

Adjustment Procedure

1) Travel the tape and check the bottom surface of the tape travels along with the guide line of the lower drum.
2) If the tape travels toward the lower part of guide line on the lower drum, turn the guide roller height adjusting screw to the left
3) If it travels to the upper part, turn it to the right.
4) Adjust the height of the guide roller to ensure that the tape is guided on the guide line of the lower drum at the inlet/outlet of the drum. (Fig. C-4-1)

ADJUSTMENT DIAGRAM

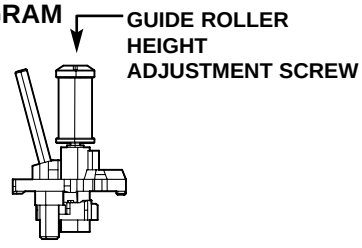


Fig. C-4-1

4-2. Fine Adjustment

Fixtures and tools used	Measuring tools and connection position	VCR (VCP) status	Adjustment position
• Oscilloscope • Standard test tape • Post height adjusting driver	• CH-1: PB RF Envelope • CH-2: NTSC : SW 30Hz PAL : SW 25Hz • Head switching output point • RF Envelope output point	• Play the standard test tape.	• Guide roller height adjusting screw

1) Play the standard test tape after connecting the probe of oscilloscope to the RF envelope output point and the head switching output point.
2) Tracking control (playback) : Locate it at the center (Set the RF output to the maximum value via the tracking control when such adjustment is completed after the drum assembly is replaced.)
3) Height adjusting screw: Flatten the RF waveform. (Fig. C-4-2)
4) Move the tracking control (playback) to the right/left. (Fig. C-4-3)
5) Check the start and the end of the RF output reduction width are constant.

CAUTIONS

There must exist no crumpling and folding of the tape due to excess adjustment or insufficient adjustment.

Waveform

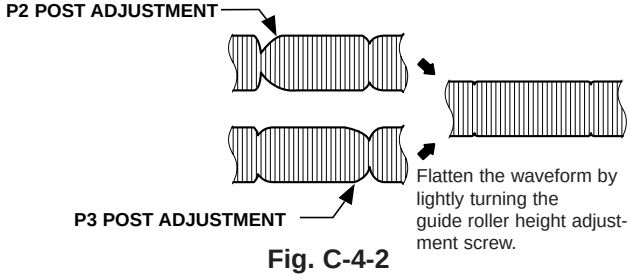


Fig. C-4-2

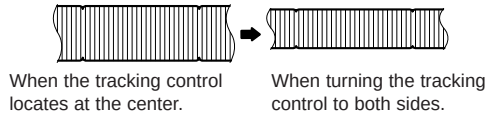
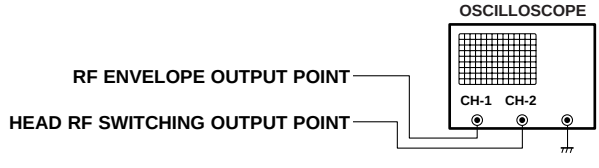


Fig. C-4-2

Connection Diagram



DECK MECHANISM ADJUSTMENT

5. Audio/Control (A/C) Head Adjustment

Purpose of adjustment : To ensure that audio and control signals can be recorded and played according to the contract tract by constantly maintaining distance between tape and head, and tape tension between the P3 post and the P4 post.

5-1. Prior Adjustment (performed only when no audio output appears in play of the standard test tape)

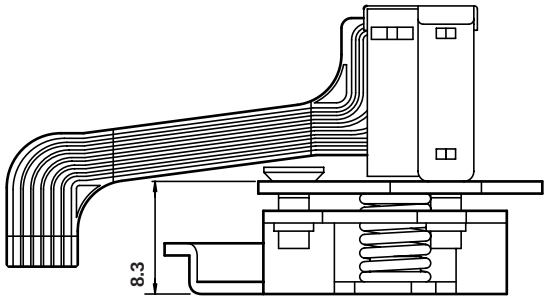
Fixtures and tools used	VCR (VCP) status	Adjustment position
• Blank Tape (Empty Tape) • Driver (+) Type ø 5	• Play the blank tape (empty tape).	• Tilt adjusting screw (C) • Height adjusting screw (B) • Azimuth adjusting screw (A)

Adjustment Procedure/Adjustment Diagrams

1) Basically use the A/C head assembly adjusted as in SPEC.
2) Check there is crumpling and folding of the tape around the A/C head. If it is, Turn and adjust the tilt adjusting screw to ensure that the tape corresponds to the bottom guide of the P4, and recheck the tape path after proceeding play for 4-5 seconds.
3) Where the tape bottom is not equal to Fig. C-5-3, Adjust the height by using the height adjusting screw (B) and then readjust it by using the tilt adjusting screw (C).

CAUTIONS

Always check the height of the A/C head since most ideal height of A/C head can be obtained when the bottom part of the tape is away 0.2 ~ 0.25mm from the bottom part of the A/C head.



A/C Head Base

Fig. C-5-1

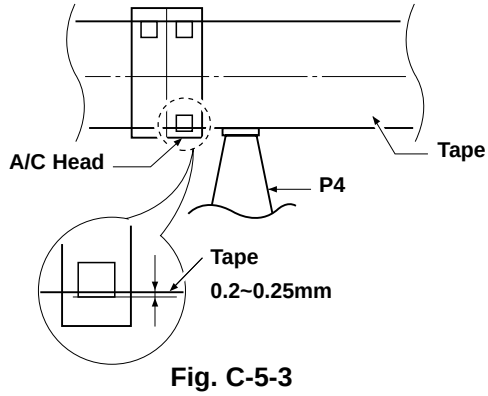
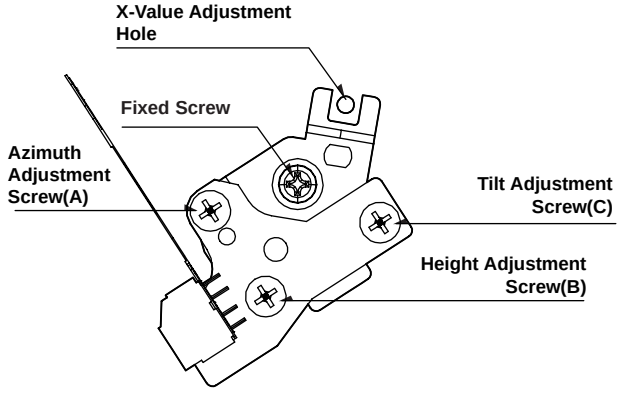


Fig. C-5-3



A/C Head Assembly

Fig. C-5-2

5-2. Tape Path Check between Pinch Roller and Take up Guide (Check in the Rev Mode)

1) Check the tape pass status between the pinch roller and the take-up guide.(Check there is crumpling of the tape pass and folding of the take-up guide.)
   (1) When holding of the take-up guide bottom occurs Turn the tilt adjusting screw (C) clockwise and travel it stably to ensure there is no crumbling or folding of the tape.
   (2) When holding of the take-up guide top occurs Turn the tilt adjusting screw (C) anti-clockwise and travel it stably to ensure there is no crumbling or folding of the tape.

2) Check there is folding of the tape at the bottom or top of the take-up guide in cutting-off the REV mode

CAUTIONS

If the RF waveform is changed after adjusting the A/C head, perform fine adjustment to ensure the RF waveform is flattened.

5-3. Fine Adjustment (Azimuth Adjustment)

Fixtures and tools used	Connection position	VCR (VCP) status	Adjustment position
• Oscilloscope • Standard test tape (only for SP) • Driver (+) Type Ø 4	• Audio Output Jack	• Play the standard test • Tape, 1KHz, 7KHz.	• Azimuth Adjusting Screw (A) • Height Adjusting Screw (B)

Adjustment Procedure

1) Connect the probe of Oscilloscope to the audio output jack.
2) Ensure that Audio 1KHz, 7KHz output is flattened at the maximization point by adjusting the Azimuth adjusting screw (A).

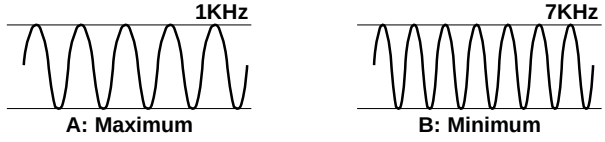
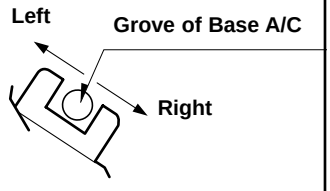


Fig. C-5-4

6. X-distance Adjustment

Purpose of adjustment : To maintain compatibility with other VCR (VCP).

Fixtures and tools used	Connection position	VCR (VCP) status	Adjustment position
• Oscilloscope • Standard test tape (only for SP) • Driver (+) Type Ø 4	• CH-1: PB RF Envelope • CH-2: NTSC ; SW 30Hz PAL:SW 25Hz • Head switching output point • RF Envelope output point	• Play the standard test tape.	

Adjustment Procedure

1) After releasing the auto tracking, lightly turn the fixing screw. Turn the (+) type driver (Ø 3 ~ Ø 4) on the X-distance adjusting hole to the right or left. Adjust the RF envelope level to the maximum point and then fix the fixing screws.
2) For the 31mm head, adjust it with the SP tape recorded in the width of 31mm since the head travels on the tape track only for SP with the width of 58mm.

Connection Diagram

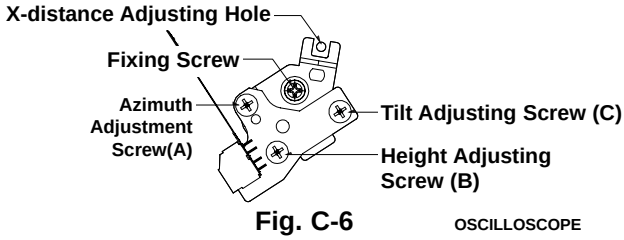
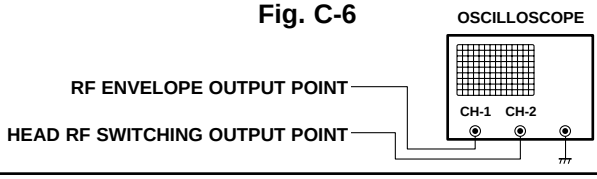


Fig. C-6



DECK MECHANISM ADJUSTMENT

7. Adjustment after Drum Assembly (Video Heads)

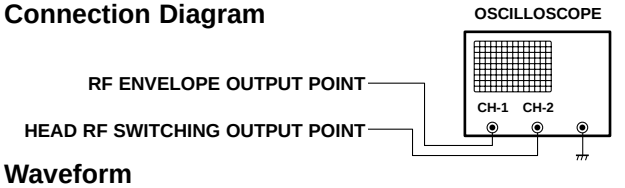
Purpose of adjustment : To adjust and stabilize the height change, X-distance change, etc depending on the guide roller after assembling the drum.

Fixtures and tools used	Connection position	VCR (VCP) status	Adjustment position
• Oscilloscope • Standard test tape (only for SP) • Post Height Adjusting Driver • Driver (+) Type Ø 5	• CH-1: PB RF Envelope • CH-2: NTSC : SW 30Hz PAL:SW 25Hz • Head switching output point • RF Envelope output point	• Play the blank tape. • Play the standard test tape.	• Fine adjustment of guide roller • Switching Point • Tracking Preset • X-distance

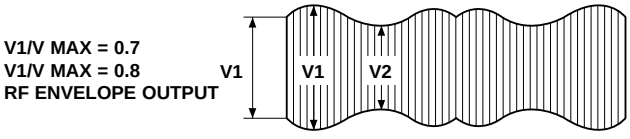
Checking/Adjustment Procedure

1) Play the blank tape (empty tape) and check whether the guide roller crumbles or wrinkles the tape and adjust it if necessary.
2) Check that the RF envelope output waveform is flat, and adjust the height of the guide roller while playing the standard test tape.
3) Adjust the switching point.
4) Check the RF envelope output is the maximum when the tracking control locates at the center. If not maximum, set up to ensure that RF envelope output becomes the maximum by turning the (+) type driver (Ø 3 ~ Ø 4) on the base A/C groove.

Connection Diagram



Waveform



8. Check of Traveling Device after Deck Assembly

8-1. Audio, RF Normalization Time (Locking Time) Check in Play after CUE or REV

Fixtures and tools used	Measuring standard	Connection position	VCR (VCP) status
• Oscilloscope • 6H 3KHz Color Bar Standard Test tape • Stop Watch	• RF Locking Time: Within 5 seconds • Audio Locking Time : Within 10 seconds	• CH-1: PB RF Envelope • CH-2: Audio output • RF Envelope output point • Audio output jack	• Play the 6H 3KHz Color Bar Standard Test tape.

Checking Procedure

1) Check that locking time of the RF and Audio waveform is fallen within the measuring standard in conversion of the play mode from the CUE or the REV mode.
2) Readjust the paragraph 5 and 6 if it deviates from the standard.

8-2. Check of Tape Curl and Jam Status

Fixtures and tools used	Fixtures and tools used	Fixtures and tools used
• T-160 Tape • T-120 Tape	• There must be no jam or curl at the first, middle and end position of tape.	• Travel the tape at the position of its first and end.

Checking Procedure

1) Check there is no abnormality of every traveling post status.
2) There must be no abnormal operation of the counter in occurrence of folding of the bottom tape. There must be not abnormality of audio signal in damage of the top tape.
3) If there is abnormality, readjust the adjustment paragraph 4 and 5.

1. Checking Points prior to Repair

Following abnormal phenomena may be repaired by removal of foreign materials and oil supply. Check oiling is required at the checking set or cleaning status is complete. Determine that necessity of checking and repair the set exists after checking the using period of the set together with the user. In this case, followings must be checked:

Phenomena	Checking Points and Cause	Replace-ment
Color beat	Pollution of Full-Erase Head	o
S/N, Color Faded	Pollution of Video Head	o
Horizontal, Vertical Jitte	Pollution of Video Head or Tape Transport System	o
Poor Sound, Low Sound	Pollution of Audio/Control Head	o
No tape wound or tape wound loosely. FF or REW impossible, or slow turning	Pollution of Pinch Roller or Belt Capstan Belt	o
Tape loosely wound in REV or Unloading	Deterioration of Clutch Assembly D37 Torque	o
	Pollution of Drum and Traveling Device	Fig. C-9-3

CAUTIONS

If operation of the position with (O) mark is abnormal even after removing cause, replace it with substitute product since it shows damage or wearing.

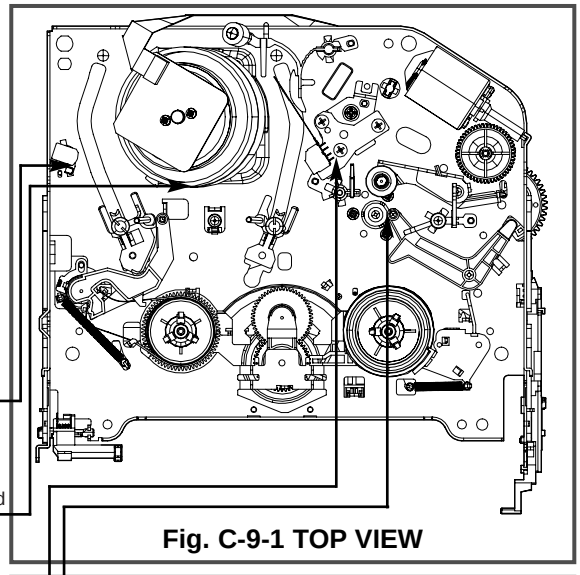


Fig. C-9-1 TOP VIEW

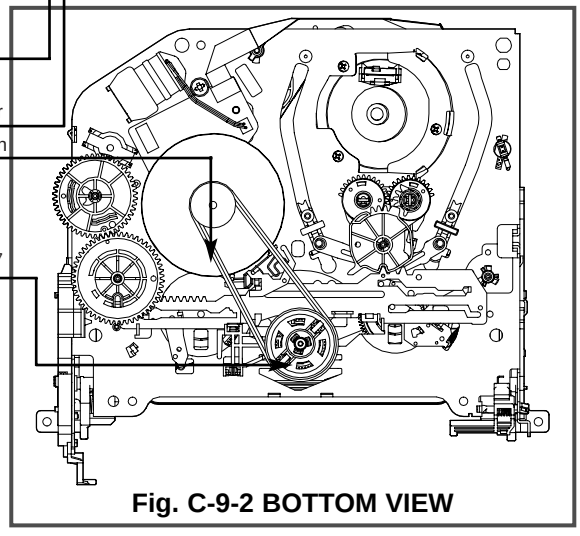


Fig. C-9-2 BOTTOM VIEW

*** No. (1) ~ (12) shows sequence that the tape moves from the supply reel to the take-up reel.)**

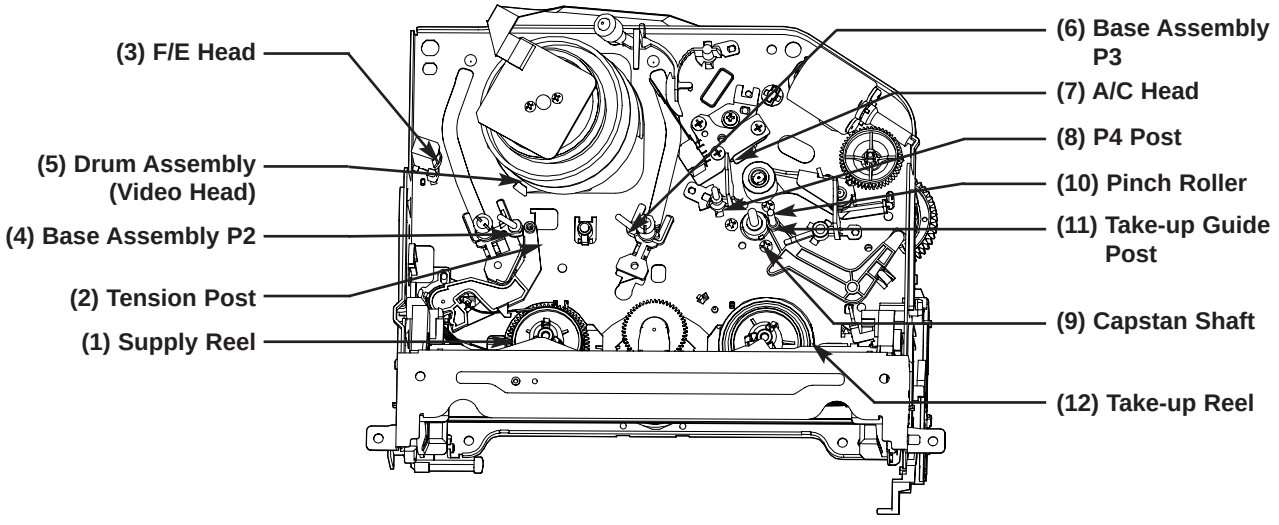


Fig. C-9-3 Tape Transport System

2. Essential Check and Repair

Recording density of the video is far higher than the audio. Therefore video parts are very precise so as to allow only error of 1/1000mm or so in order to maintain compatibility with other videos.
If one of these parts is polluted or old, same phenomena will appear as they are damaged.
To maintain clear screen, regular check, replacement of old and damaged parts and oil supply, etc are essential.

3. Regular Check and Repair

Check and repair schedule is not constant since they vary depending on method that the consumer uses video and environment where the video is installed at.
However, for the video used by common household, good screen will be maintained if regular check and repair per 1,000 hour is performed. The following chart shows relationship between using time and checking time:

Table 1

Time Requiring Checking / Average hours used per day	About 1 year	About 18 months	About 3 years
One hour	■	■	■
Two hours		■	■
Three hours			■

4. Tools for Check and Repair

(1) Grease: Floil G-3114 (KANTO) or equivalent grease (Green)
(2) Grease: Kanto G-754, PL-433 (Yellow)
(3) Alcohol (Isopropyl Alcohol)
(4) Cleaning Patch (cloth)

5. Maintenance Process

5-1) Removal of Foreign Material

(1) Removal of foreign material from video head (Fig. C-9-4)
Firstly try to use a cleaning tape.
Use a cleaning patch if foreign materials are not removed with the cleaning tape due to severe dirty of the head. Soak the cleaning patch in alcohol and put it to the head tip. Smoothly turn the drum (turning cylinder) to the right or left (In this case, the cleaning patch must not be moved vertically).
After completely drying the head, test the traveling status of the tape.
If alcohol (Isopropyl Alcohol) remains at the video head, the tape may be damaged when this solution touches with the head surface.

Never use a cloth bar (commercial sale)

(2) Wipe the tape transport system and the drive system with the cleaning patch soaked in alcohol (Isopropyl Alcohol) when removing foreign materials from them.
1) The part touched with the traveling tape is called as tape transport system. The drive system consists of parts to travel the tape.
2) Care must be exercised so that unreasonable force to change the pattern will be applied to the tape transport system during removal of foreign materials.

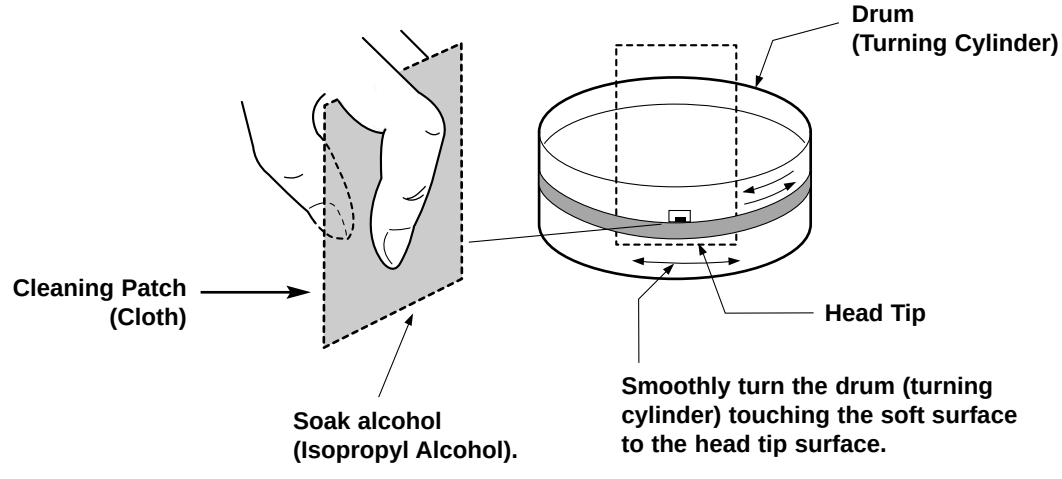


Fig. C-9-4

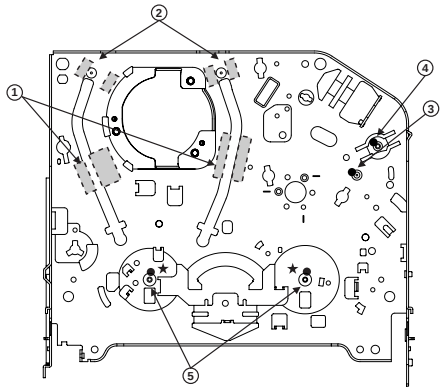
5-2) Grease Applications

(1) Grease Application Method

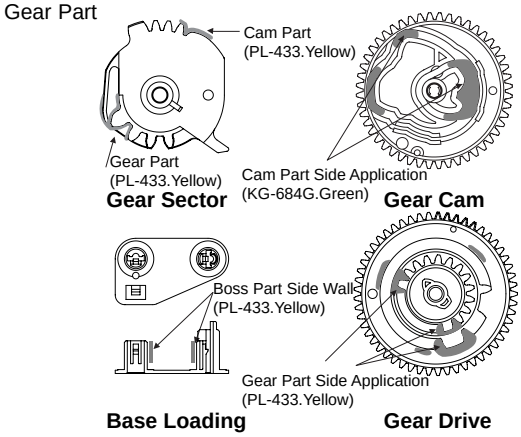
Apply grease by using a cloth swab or brush. Care must be exercised so that excess quantity should not be used. If the excessive quantity is applied, wipe it with the gauze soaked in alcohol (Isopropyl Alcohol).

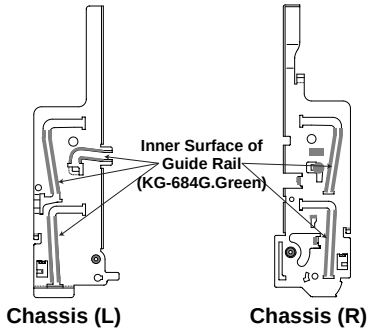
NOTE: POSITION OF GREASE APPLICATION

(1) Inner Side Surface and Top Surface of Loading Path
(2) Stable Adhesion Part of Base P2, P3
(3) Arm Pinch Shaft
(4) Gear Wheel Shaft
(5) Reel S. T. Shaft
(1) (2) (3) (4): KG-684G (Green)
(5): PL-433 (Yellow)



Chassis (TOP)

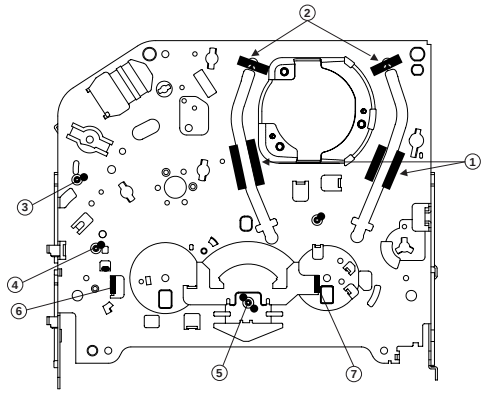




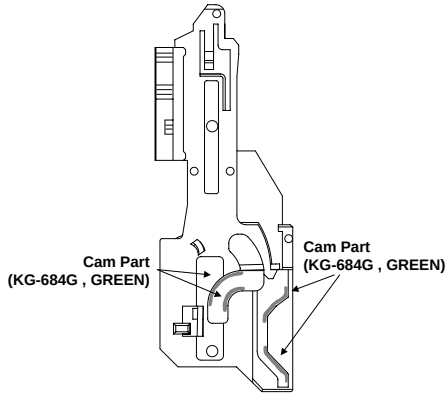
(2) Regular Grease Application

Apply grease to the designated application position every 500 hour.

(1) Inner Side Surface and Top Surface of Loading Path
(2) Stable Adhesion Part of Base P2, P3 Coil
(3) Gear Cam Shaft
(4) Gear Drive Shaft
(5) Clutch Shaft Groove
(6) Guide Part on the Plate Slider Side Wall (Left)
(7) Guide Part on the Plate Slider Side Wall (Right)
(1) (2) (3) (4) (5) (6) (7): KG-684G (Green)



Chassis (Bottom)



Gear Rack F/L

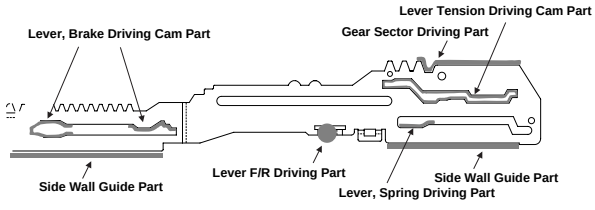
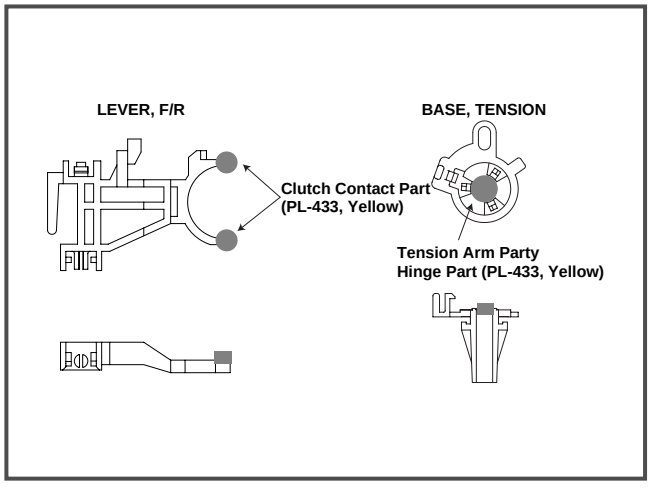
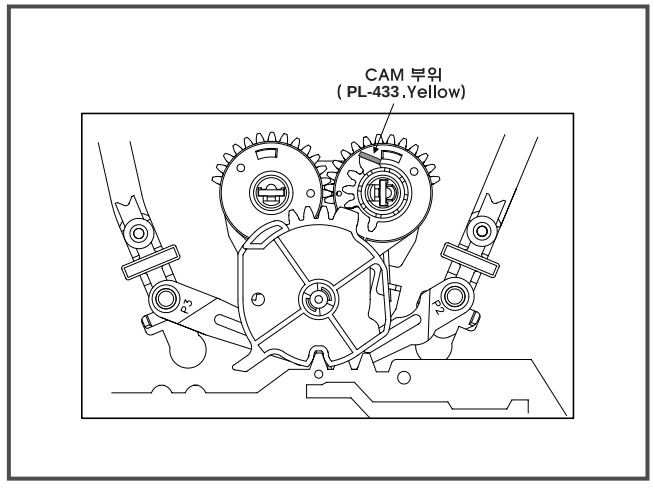


Plate Slider

Lever, F/R, Base, Tension

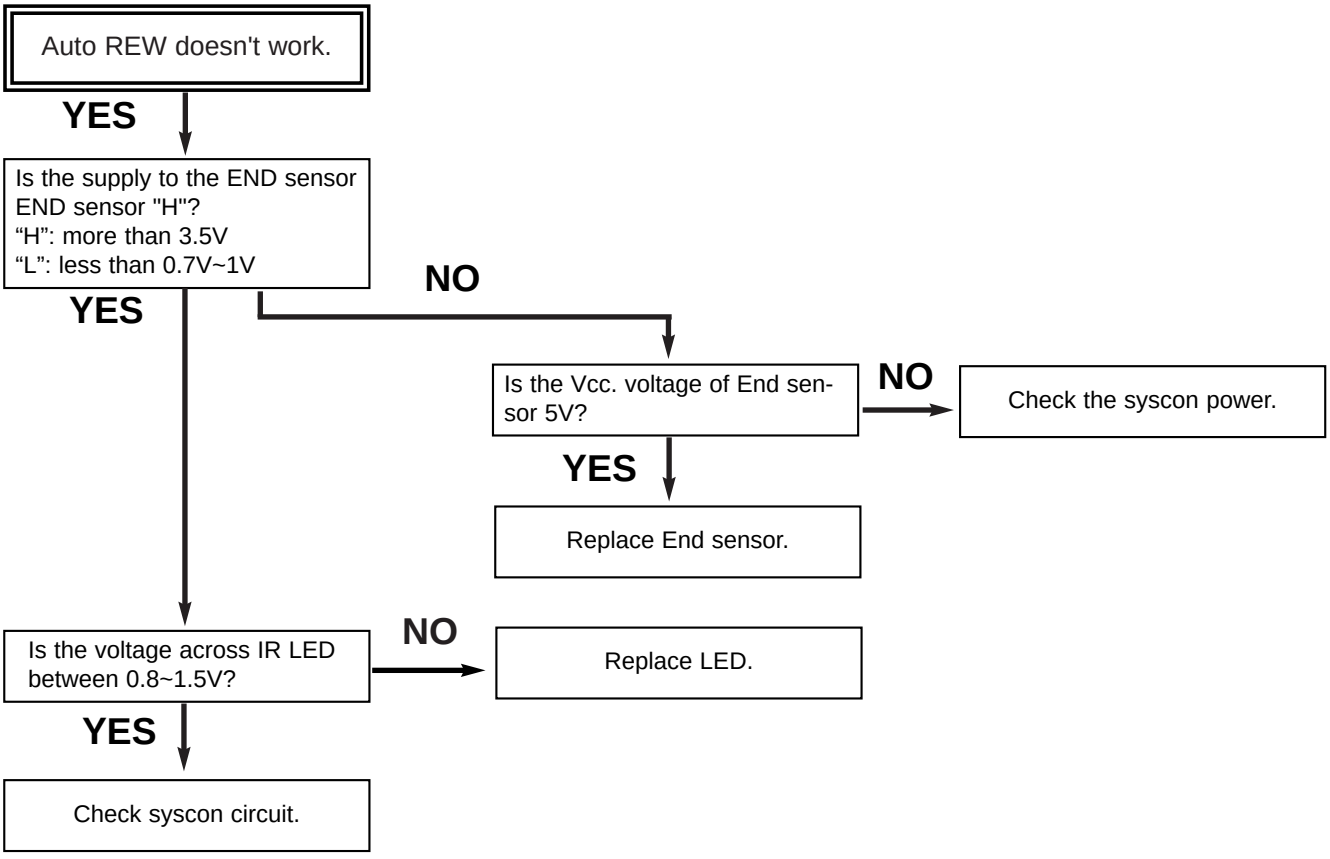


GEAR AY, P2 & P3

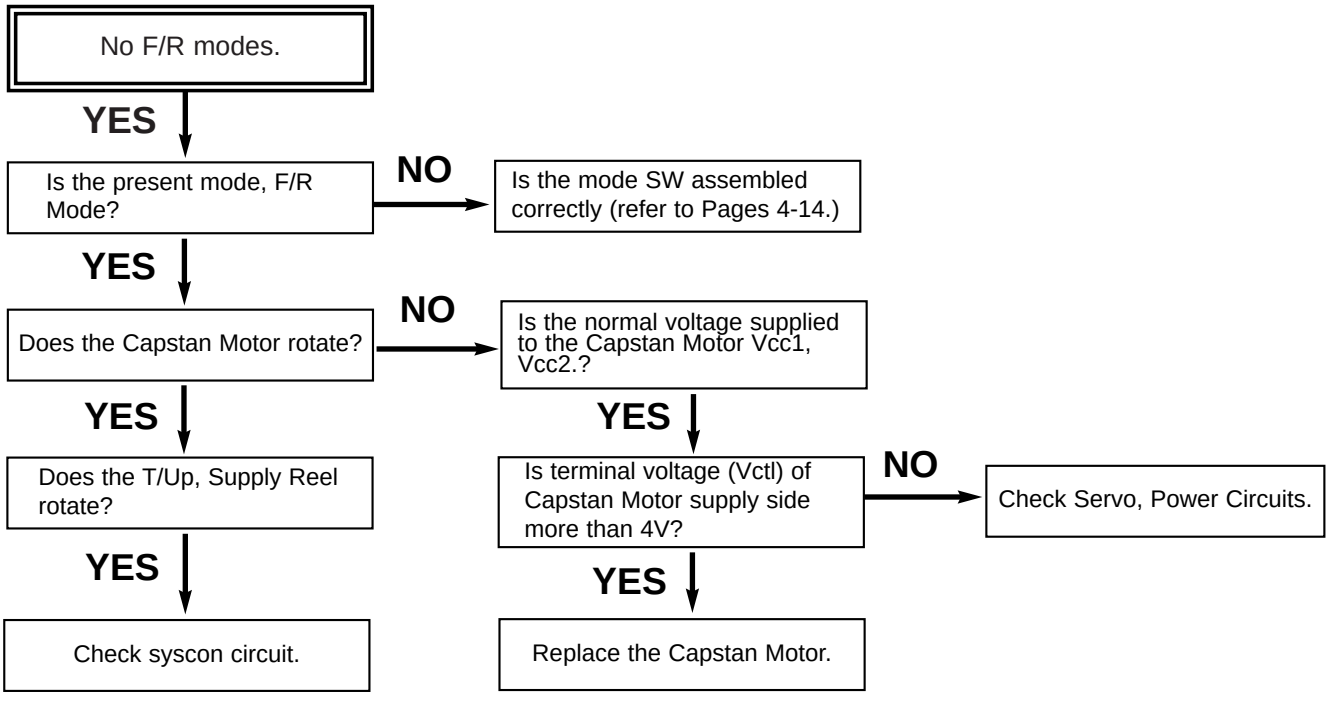


1.Deck Mechanism

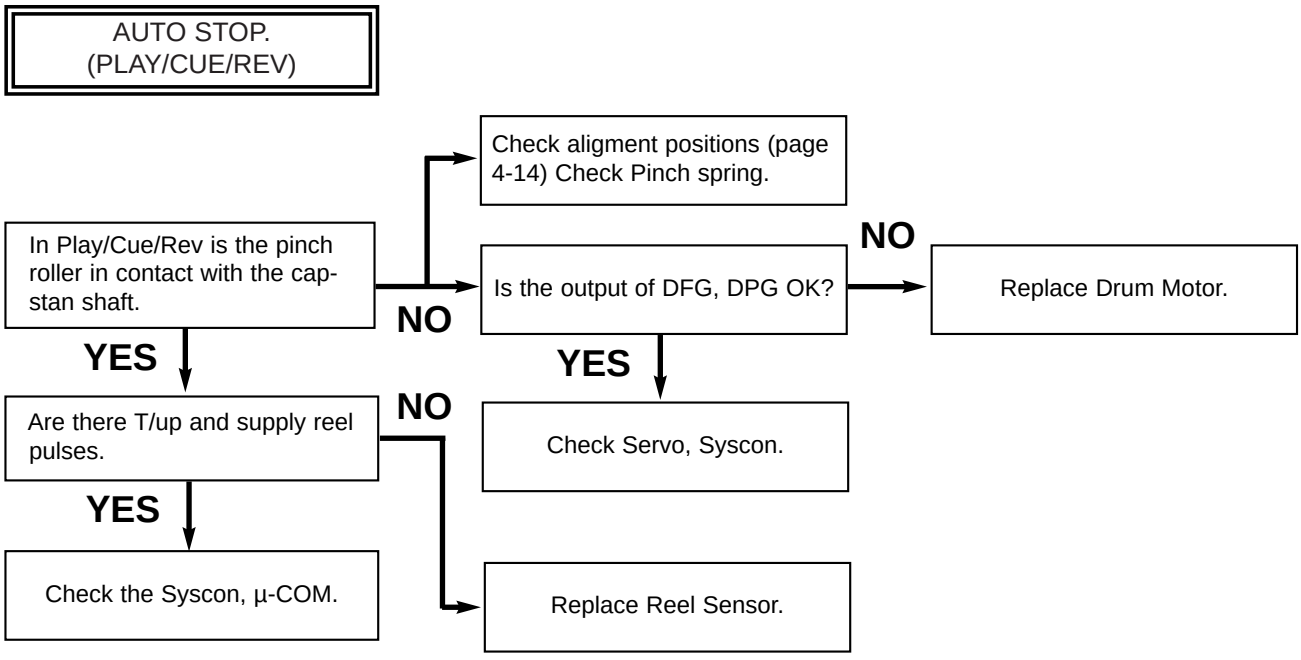
A.



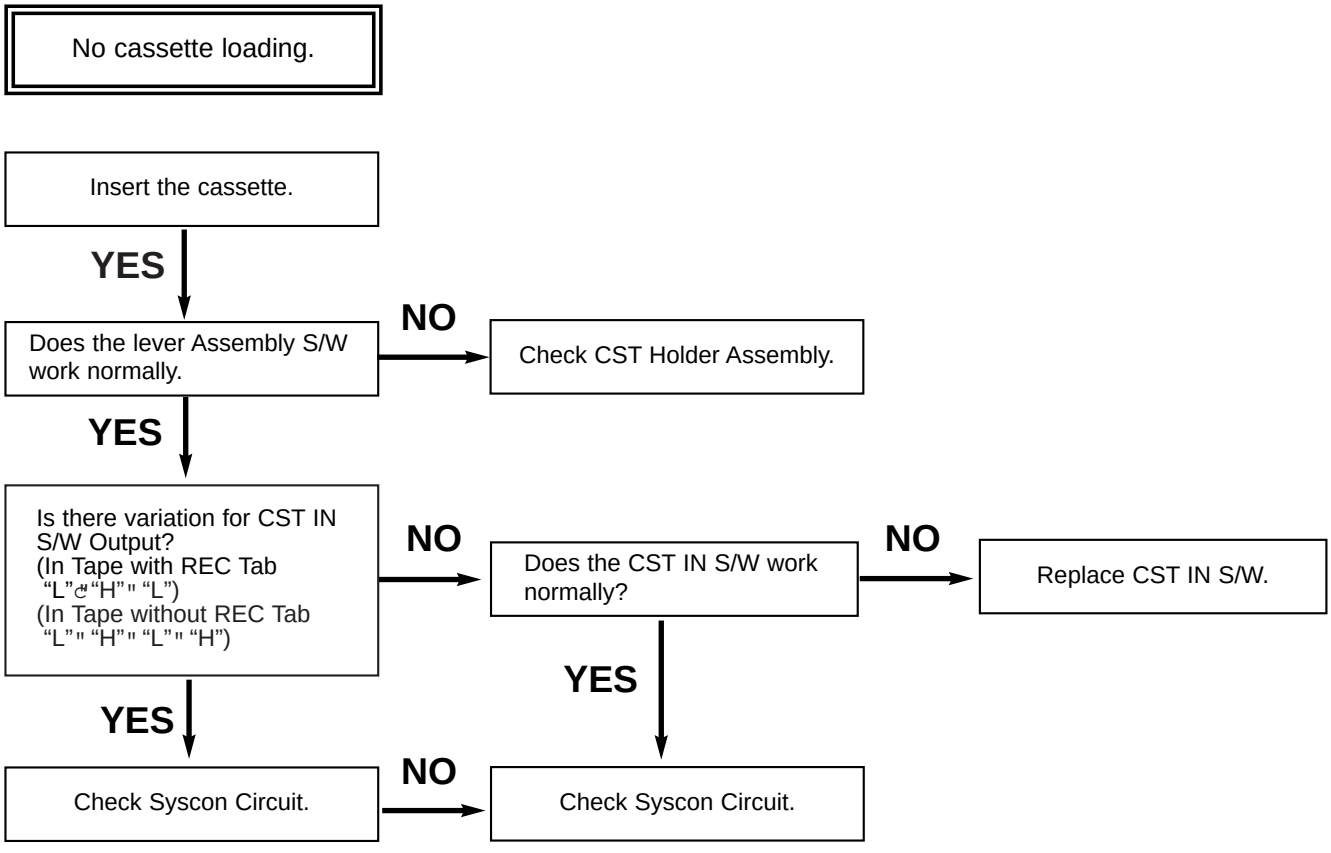
B.



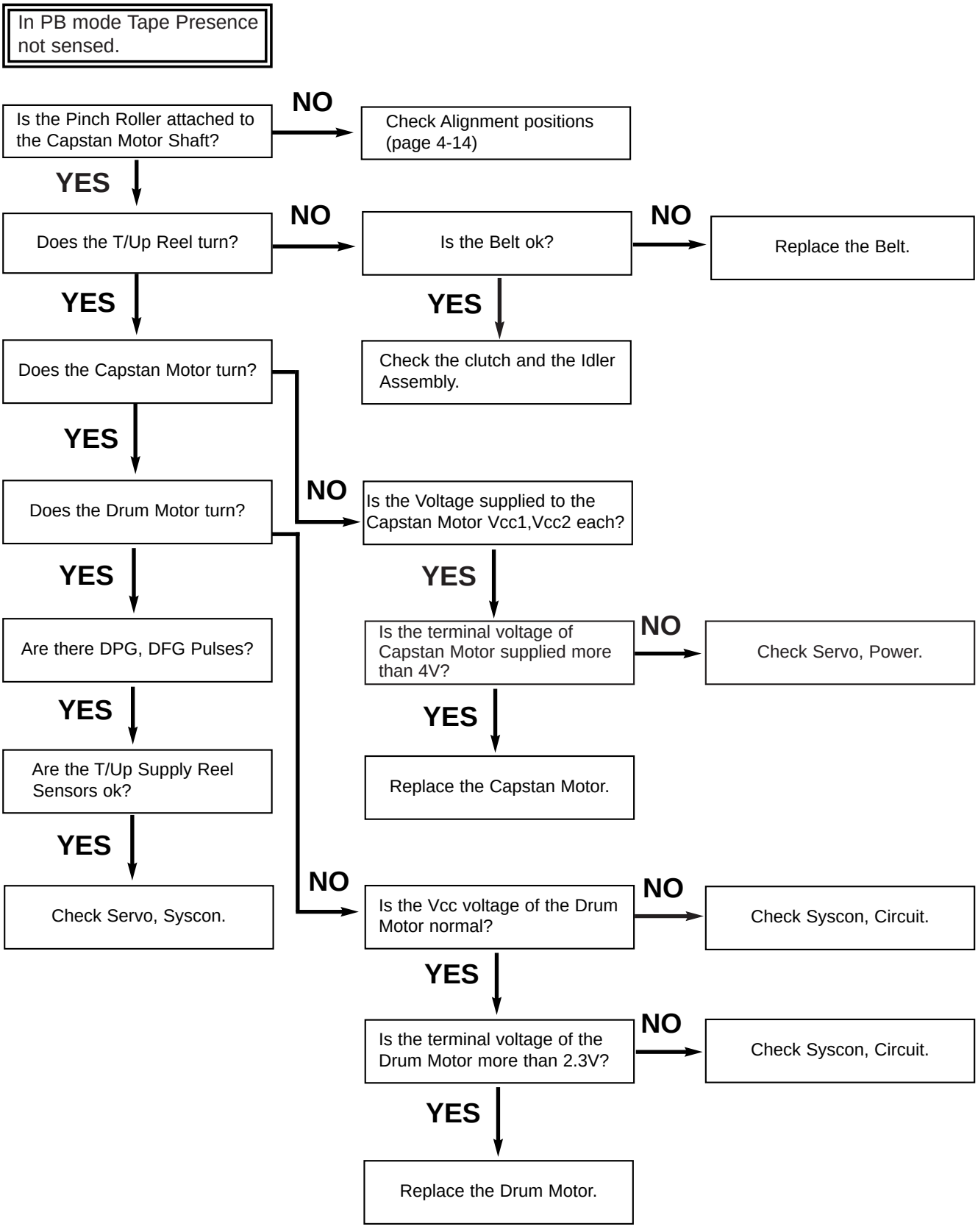
C.


AUTO STOP.
(PLAY/CUE/REV)
In Play/Cue/Rev is the pinch roller in contact with the cap-stan shaft.
NO
Check aligment positions (page 4-14) Check Pinch spring.
Is the output of DFG, DPG OK?
NO
Replace Drum Motor.
YES
YES
Are there T/up and supply reel pulses.
NO
Check Servo, Syscon.
YES
Check the Syscon, µ-COM.
Replace Reel Sensor.

D.

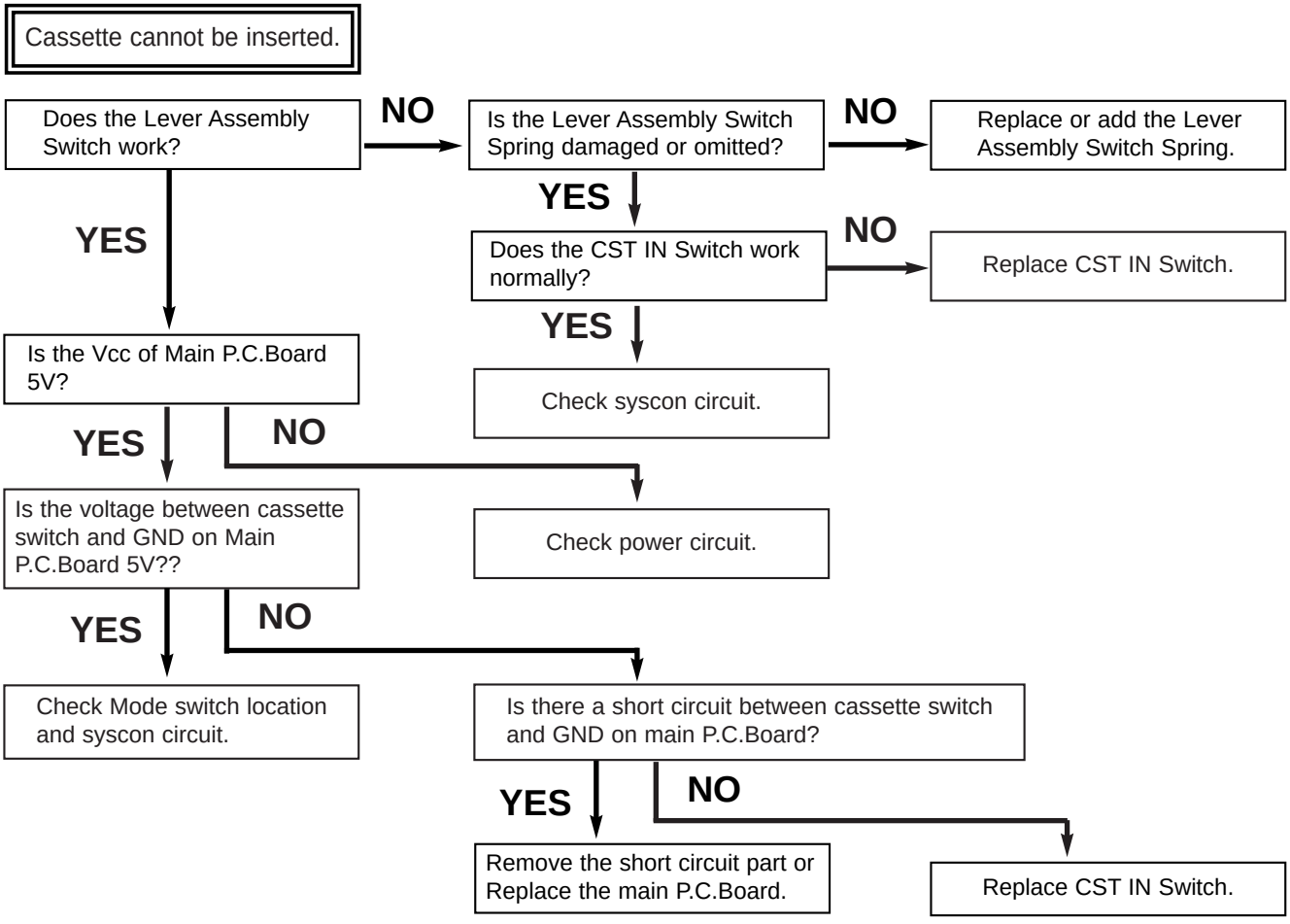

No cassette loading.
Insert the cassette.
YES
Does the lever Assembly S/W work normally.
NO
Check CST Holder Assembly.
YES
Is there variation for CST IN S/W Output?
(In Tape with REC Tab
"L"→"H"→"L")
(In Tape without REC Tab
"L"→"H"→"L"→"H")
NO
Does the CST IN S/W work normally?
NO
Replace CST IN S/W.
YES
YES
Check Syscon Circuit.
NO
Check Syscon Circuit.

E.

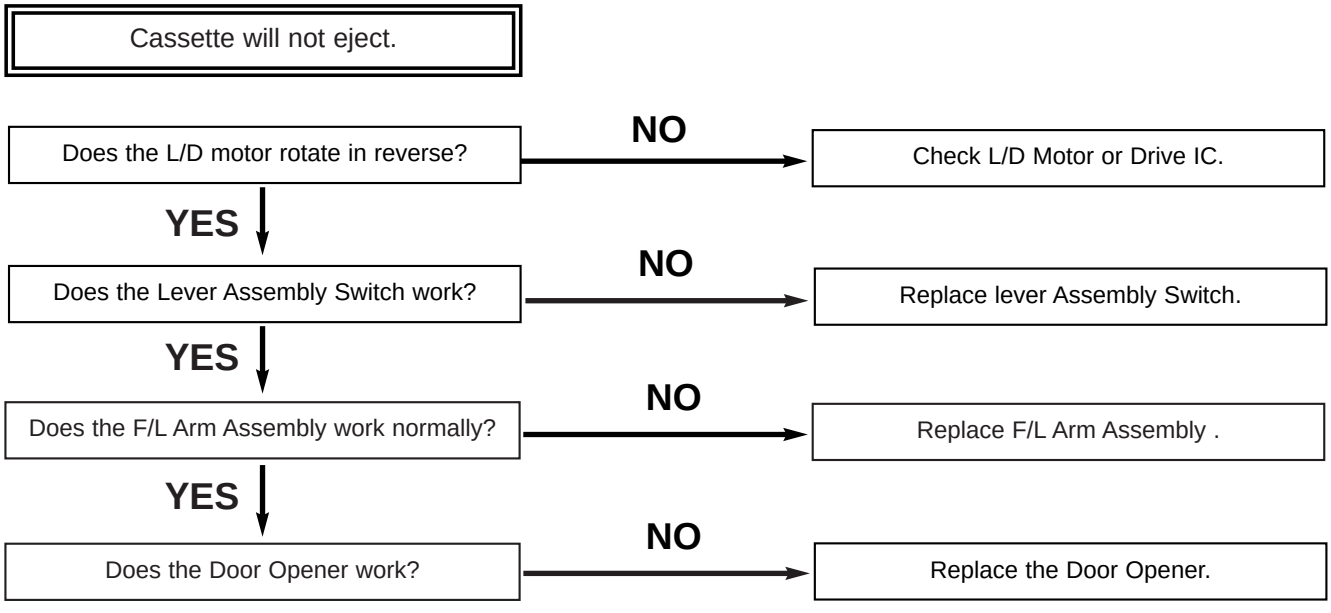

In PB mode Tape Presence not sensed.
Is the Pinch Roller attached to the Capstan Motor Shaft?
NO
Check Alignment positions (page 4-14)
YES
Does the T/Up Reel turn?
NO
Is the Belt ok?
NO
Replace the Belt.
YES
YES
Check the clutch and the Idler Assembly.
Does the Capstan Motor turn?
YES
Does the Drum Motor turn?
NO
Is the Voltage supplied to the Capstan Motor Vcc1,Vcc2 each?
YES
YES
Are there DPG, DFG Pulses?
Is the terminal voltage of Capstan Motor supplied more than 4V?
NO
Check Servo, Power.
YES
YES
Are the T/Up Supply Reel Sensors ok?
Replace the Capstan Motor.
YES
NO
Check Servo, Syscon.
Is the Vcc voltage of the Drum Motor normal?
NO
Check Syscon, Circuit.
YES
Is the terminal voltage of the Drum Motor more than 2.3V?
NO
Check Syscon, Circuit.
YES
Replace the Drum Motor.

2. Front Loading Mechanism

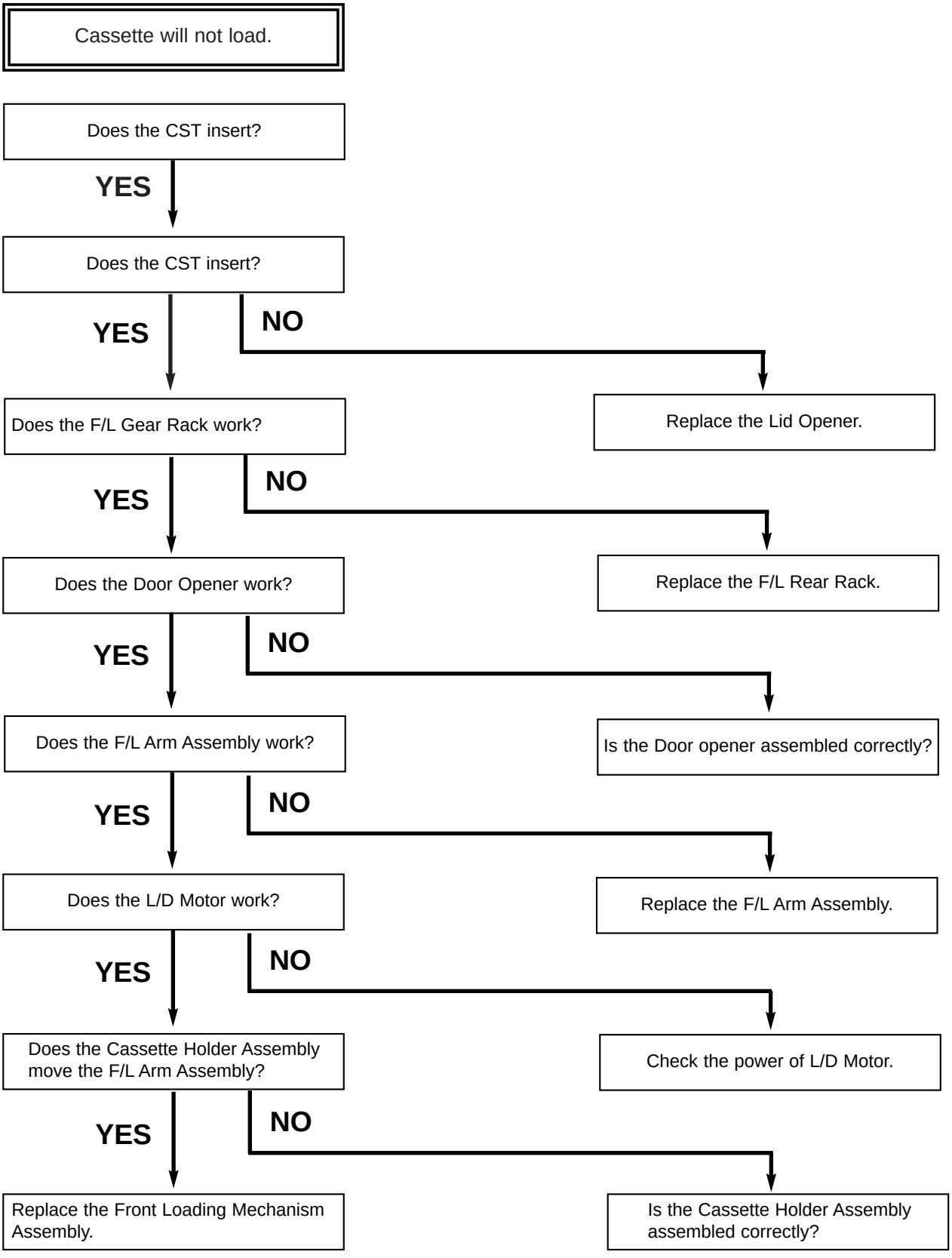
A.



B.

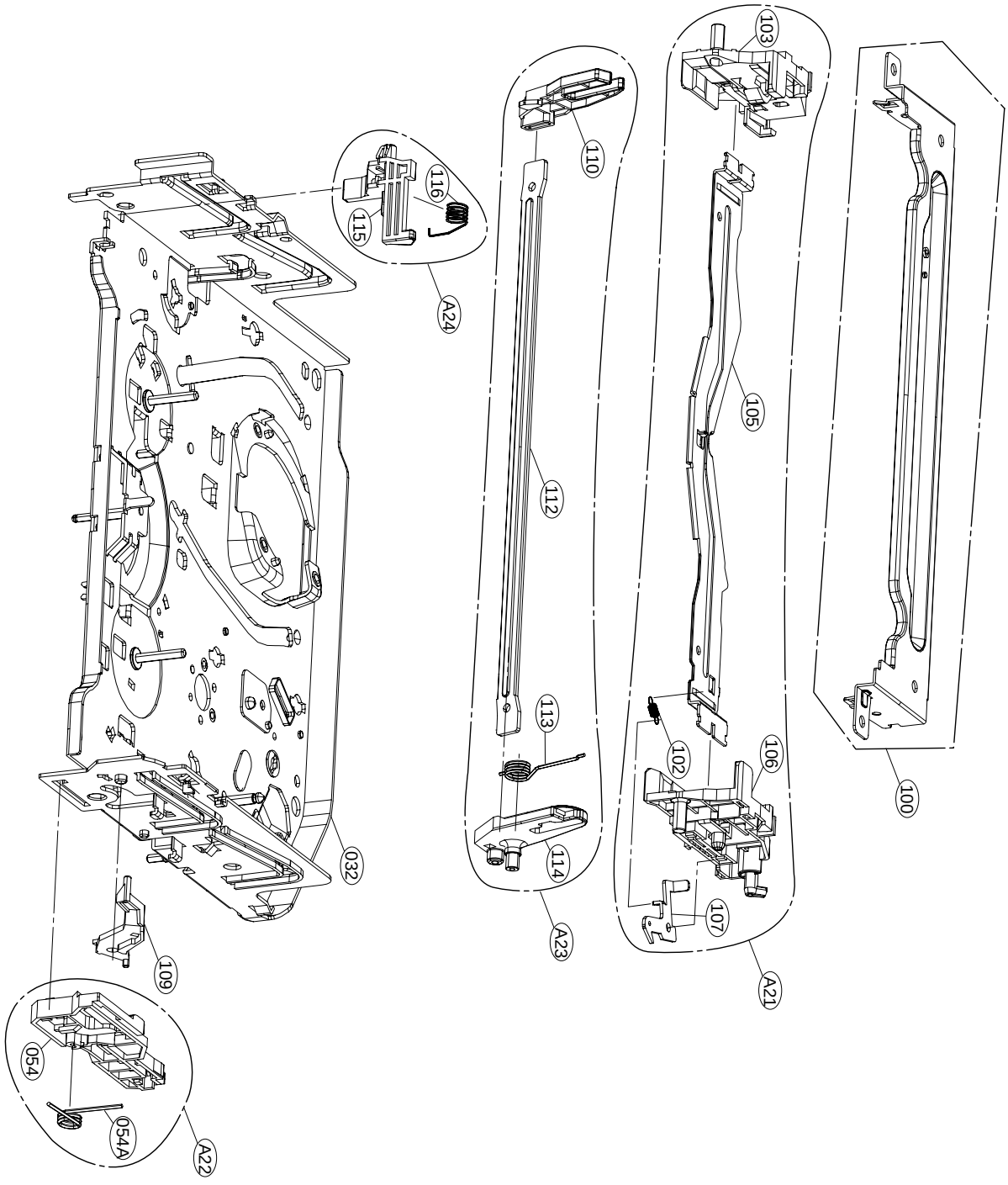


C.


Cassette will not load.
Does the CST insert?
YES
Does the CST insert?
YES
NO
Replace the Lid Opener.
Does the F/L Gear Rack work?
YES
NO
Replace the F/L Rear Rack.
Does the Door Opener work?
YES
NO
Is the Door opener assembled correctly?
Does the F/L Arm Assembly work?
YES
NO
Replace the F/L Arm Assembly.
Does the L/D Motor work?
YES
NO
Check the power of L/D Motor.
Does the Cassette Holder Assembly move the F/L Arm Assembly?
YES
NO
Is the Cassette Holder Assembly assembled correctly?
Replace the Front Loading Mechanism Assembly.

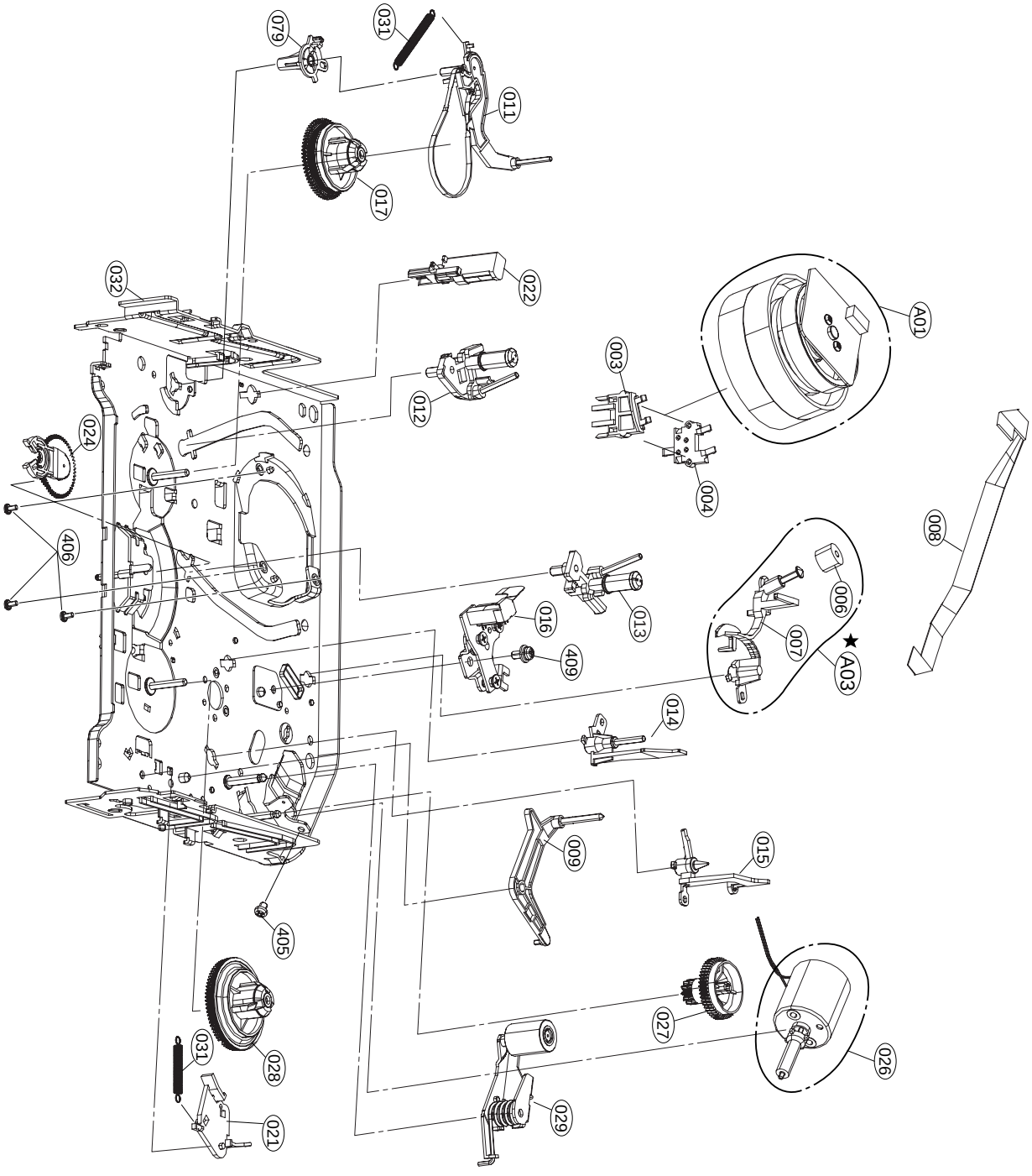
EXPLODED VIEWS

1. Front Loading Mechanism Section

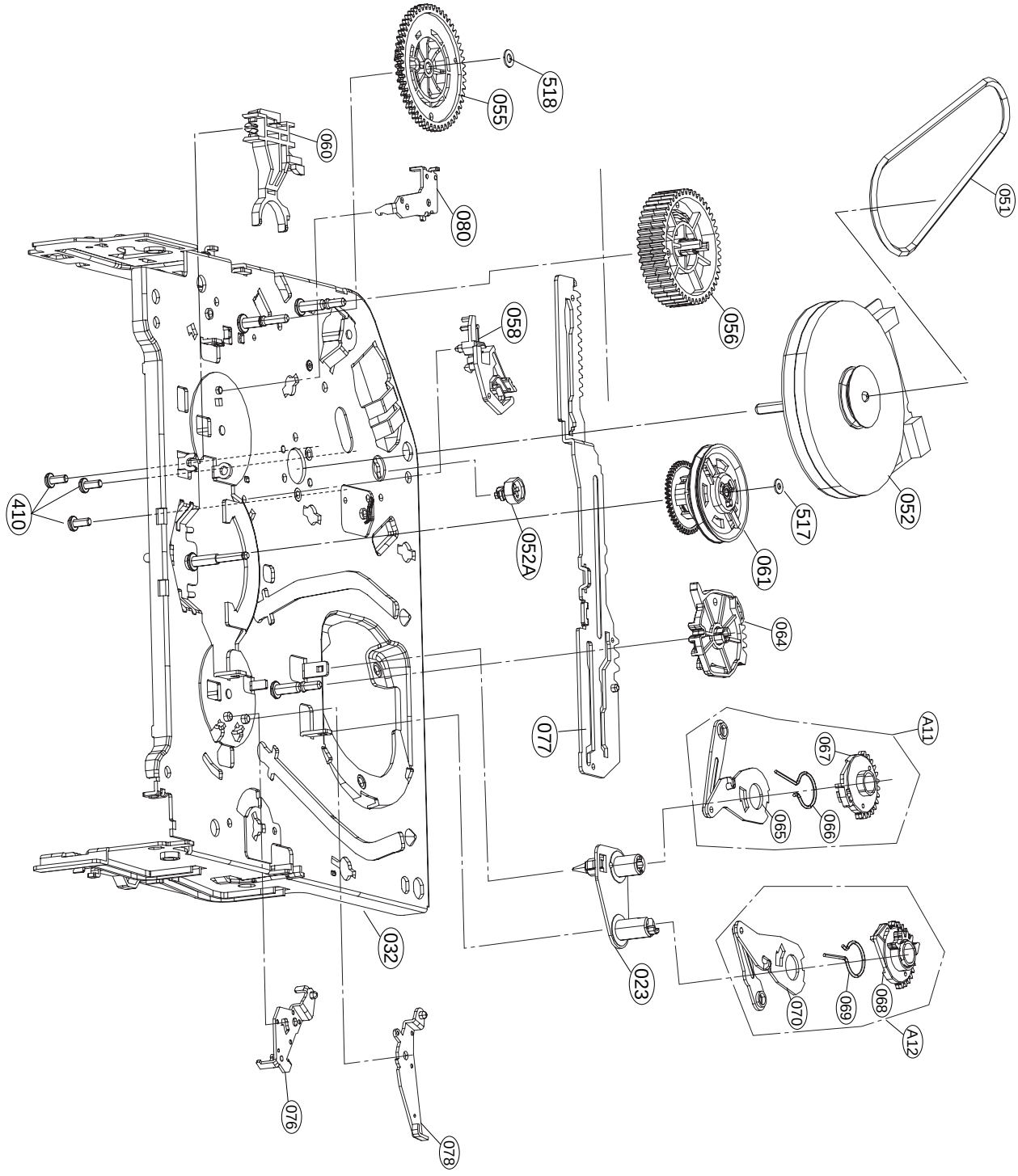


2. Moving Mechanism Section (1)

★ OPTIONAL PART



3. Moving Mechanism Section (2)



MEMO

SECTION 5
RS-01A LOADER PART

CONTENTS

ELECTRICAL TROUBLESHOOTING GUIDE 5-2

THE DIFFERENCE OF DVD-R/RW, DVD+R/RW DISCS AND DVD-ROM 5-15

1. RECORDING LAYER 5-15
2. DISC SPECIFICATION 5-16
3. DISC MATERIALS 5-16
4. ORGANIZATION OF THE INNER DRIVE AREA, OUTER DRIVE AREA, LEAD-IN ZONE AND LEAD-OUT ZONE 5-20

HOW TO USE TEST TOOL 5-24

1. ALPC MEASUREMENT SYSTEM 5-24
2. ALPC PROGRAM 5-24
3. EXECUTE ALPC PROGRAM 5-25
4. OPTICAL POWER SETTING 5-27
5. CONFIRM OPTICAL POWER SETTING PARAMETER 5-28
6. OPTICAL POWER SETTING PARAMETER RANGE 5-29
7. ATTACHMENT. OPTICAL POWER MEASUREMENT 5-30

INTERNAL STRUCTURE OF THE PICK-UP 5-31

1. BLOCK DIAGRAM OF THE PICK-UP(LPC-812R) 5-31
2. PICK UP PIN ASSIGNMENT 5-32
3. SIGNAL DETECTION OF THE P/U 5-33

DESCRIPTION OF CIRCUIT 5-34

1. ALPC (AUTOMATIC LASER POWER CONTROL) CIRCUIT 5-34
2. FOCUS/TRACKING/SLED SERVO CIRCUIT 5-35
3. SPINDLE SERVO CIRCUIT 5-37

MAJOR IC INTERNAL BLOCK DIAGRAM 5-38

LIC121 (AN22113A) : FEP(RF) ANALOG SIGNAL PROCESSOR 5-38

IC301 (BD7956FS) : CD-ROM/DVD-ROM 7CH POWER DRIVER 5-41

CIRCUIT DIAGRAMS 5-42

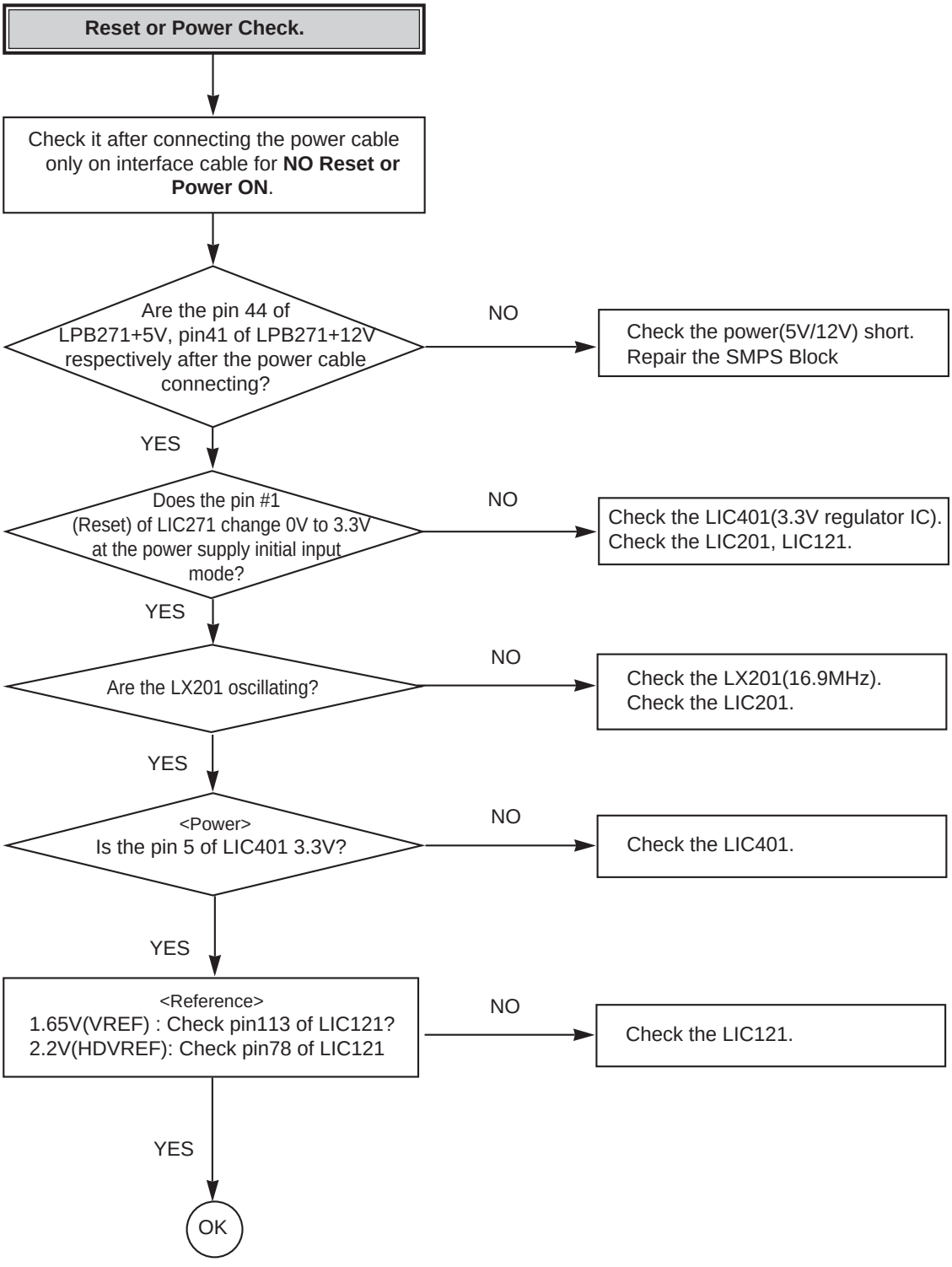
1. DSP CIRCUIT DIAGRAM 5-42
2. RF CIRCUIT DIAGRAM 5-44
3. DRIVE CIRCUIT DIAGRAM 5-46

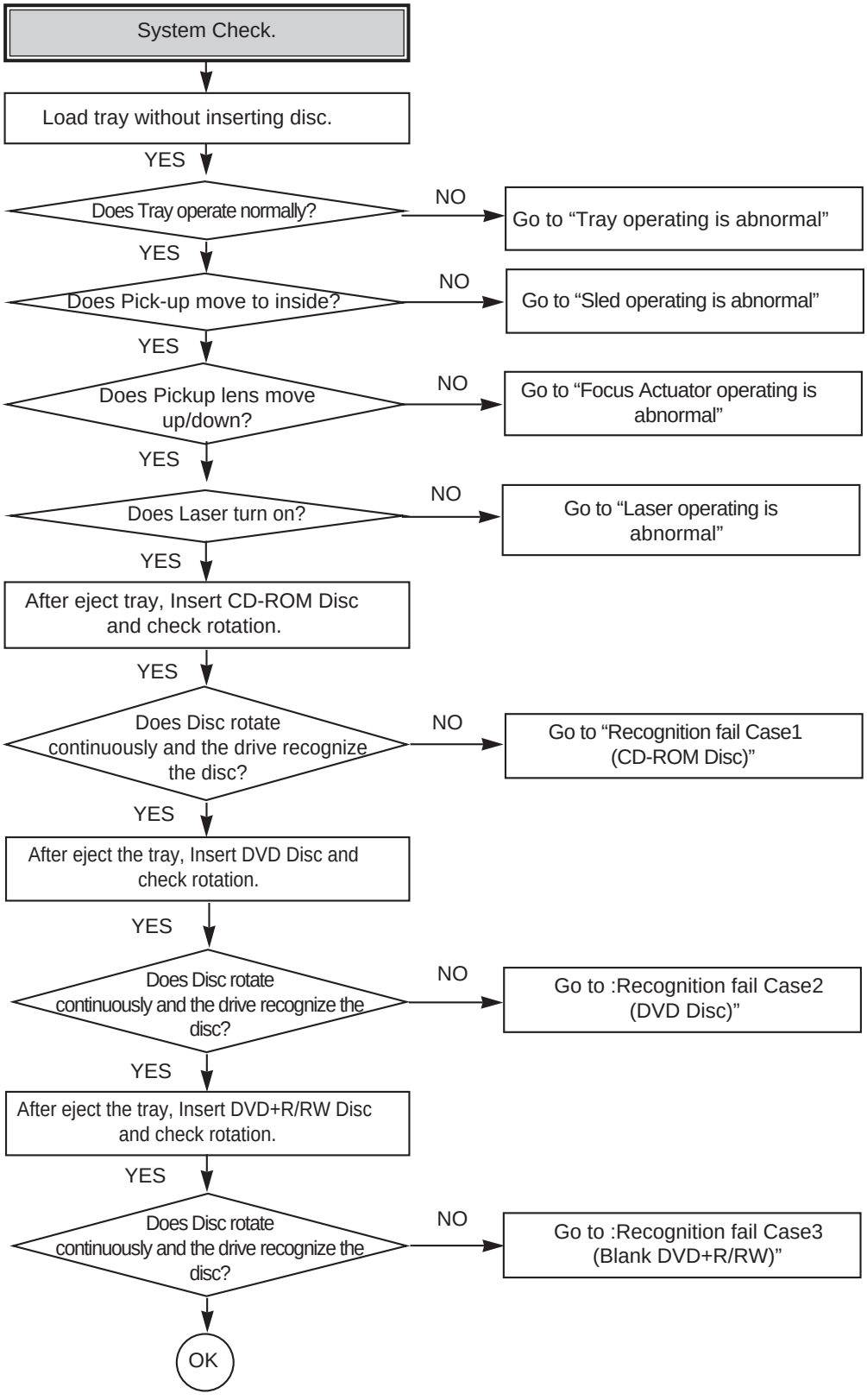
CIRCUIT VOLTAGE CHART 5-48

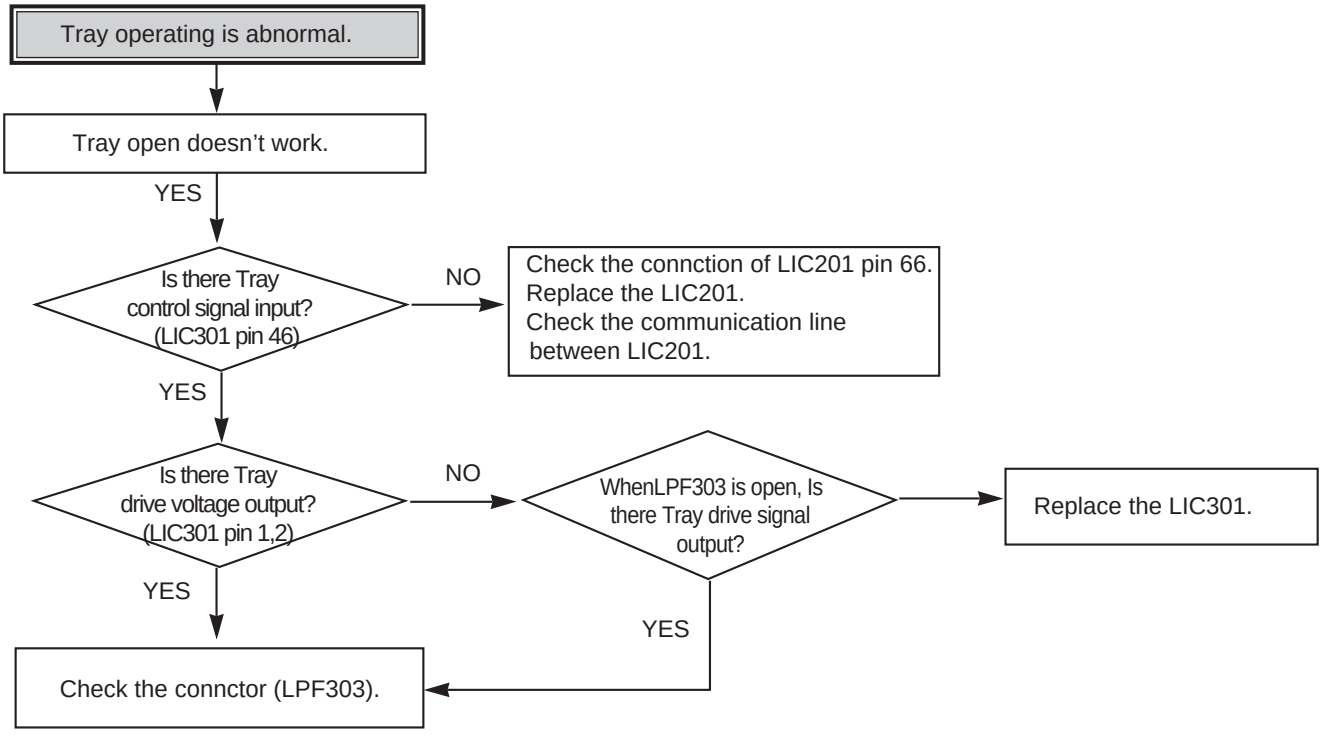
PRINTED CIRCUIT DIAGRAMS 5-50

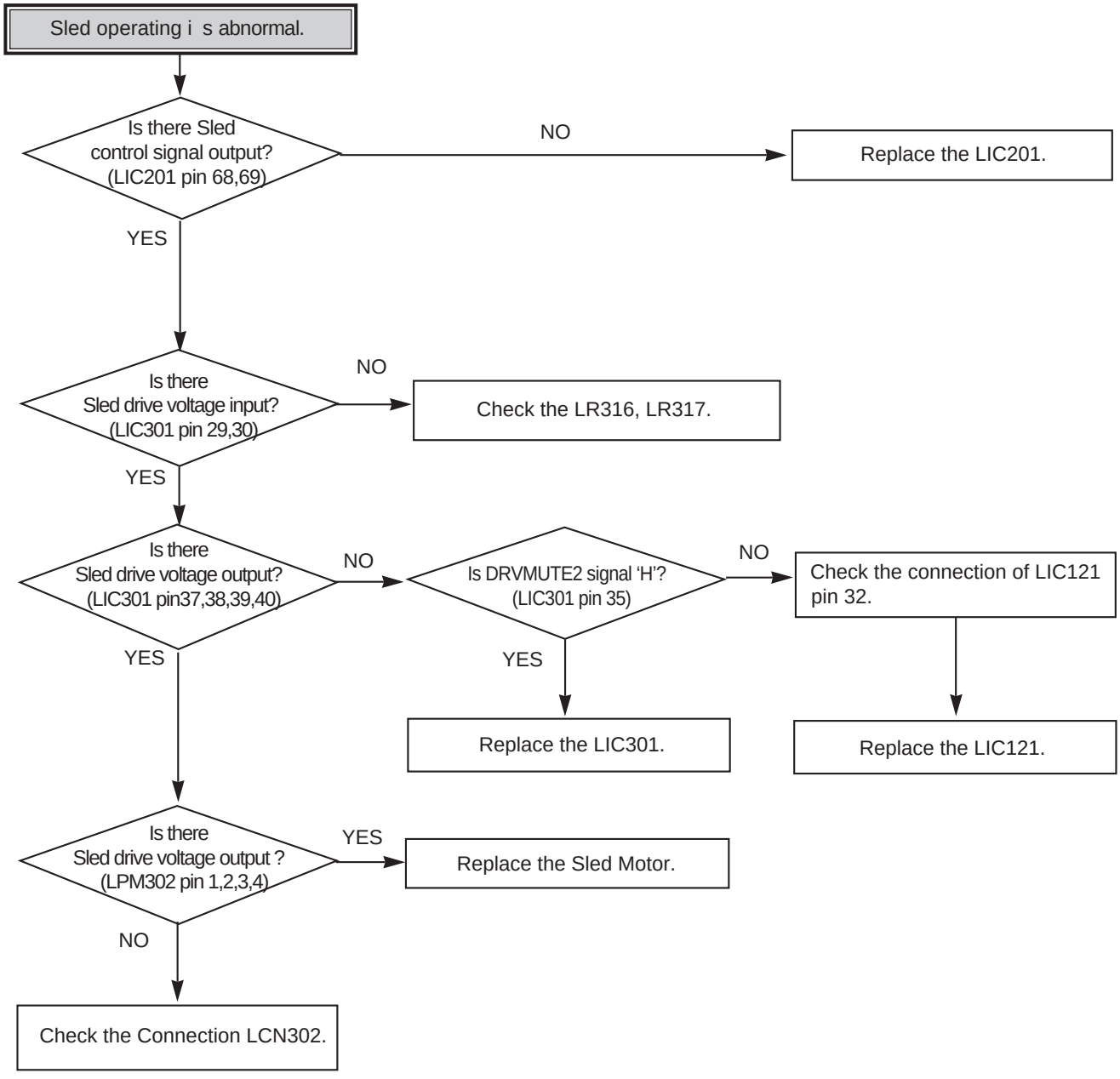
1. MAIN P.C.BOARD(TOP VIEW) 5-50
2. MAIN P.C.BOARD(BOTTOM VIEW) 5-52

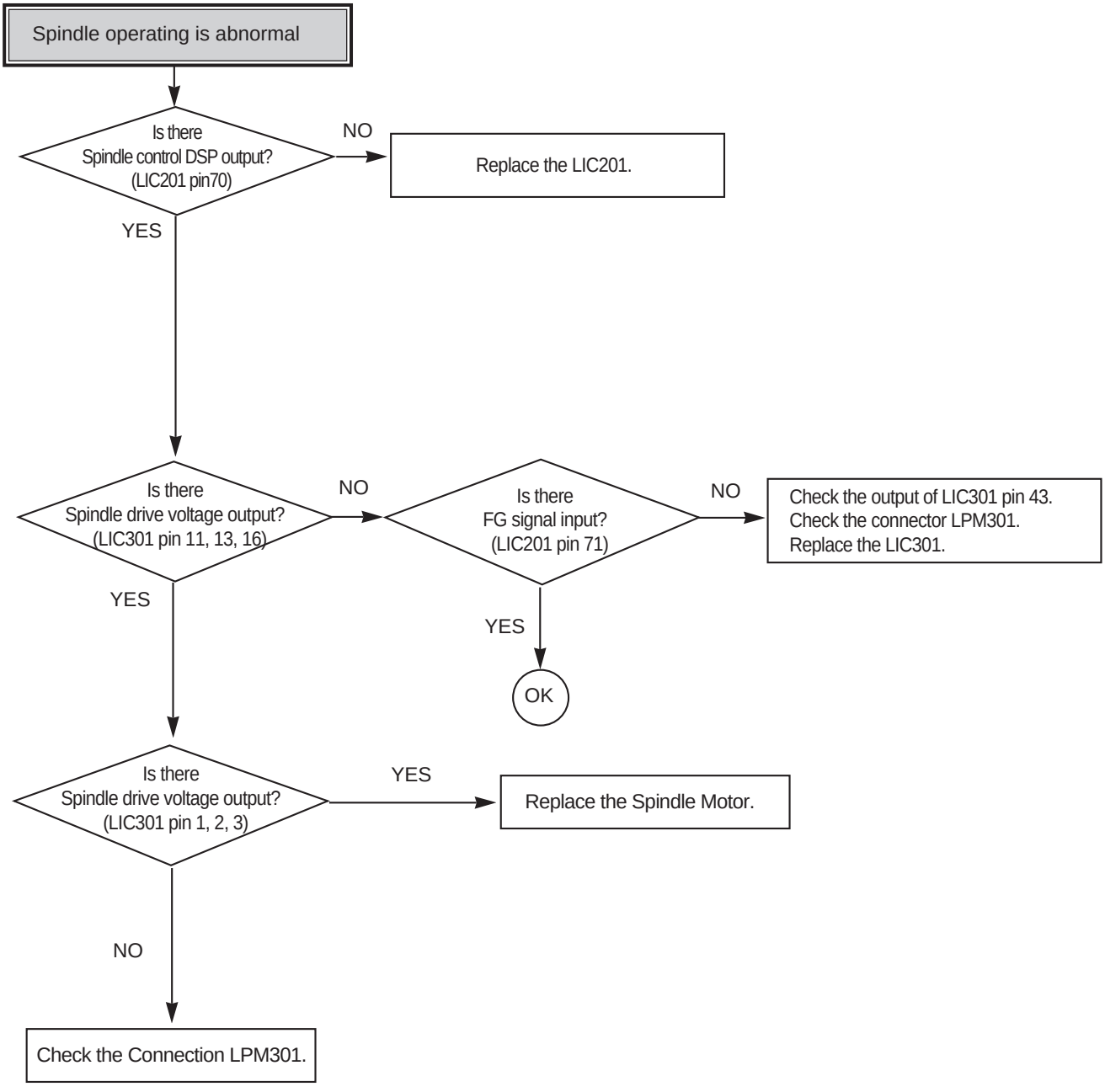
ELECTRICAL TROUBLESHOOTING GUIDE

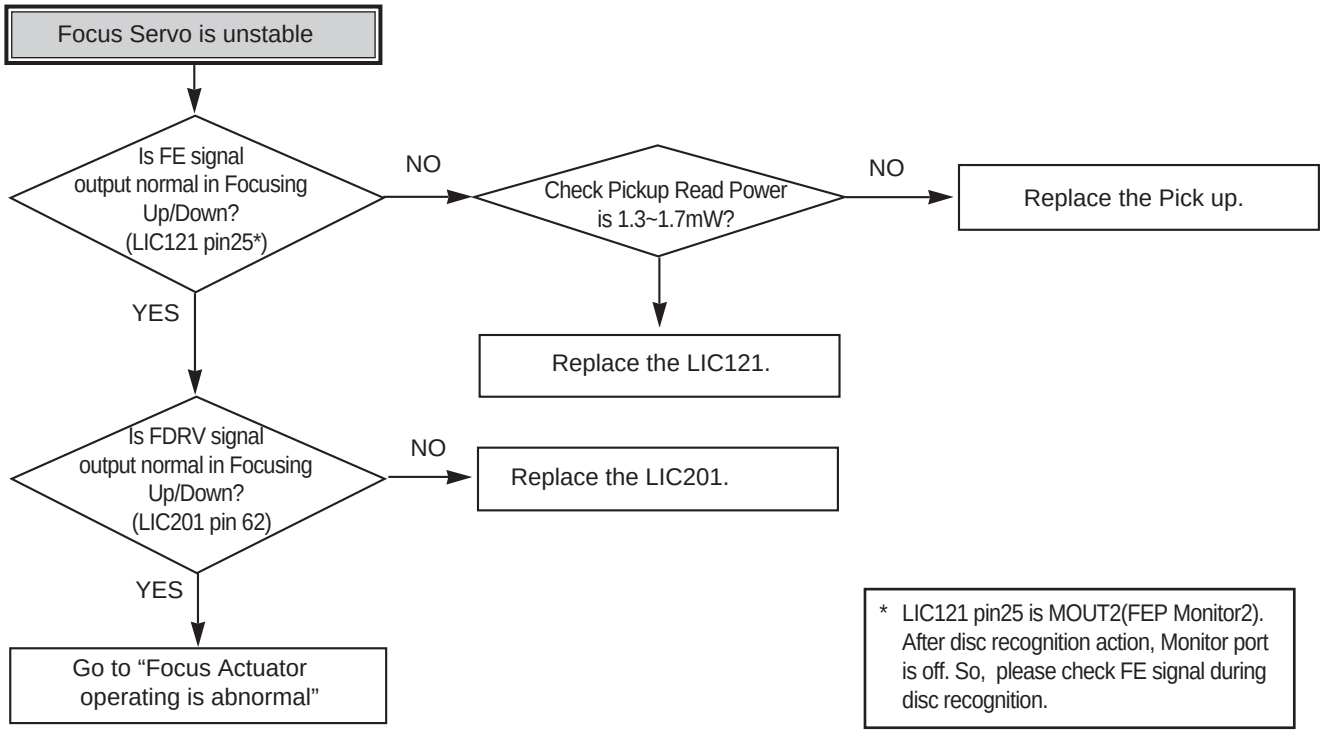


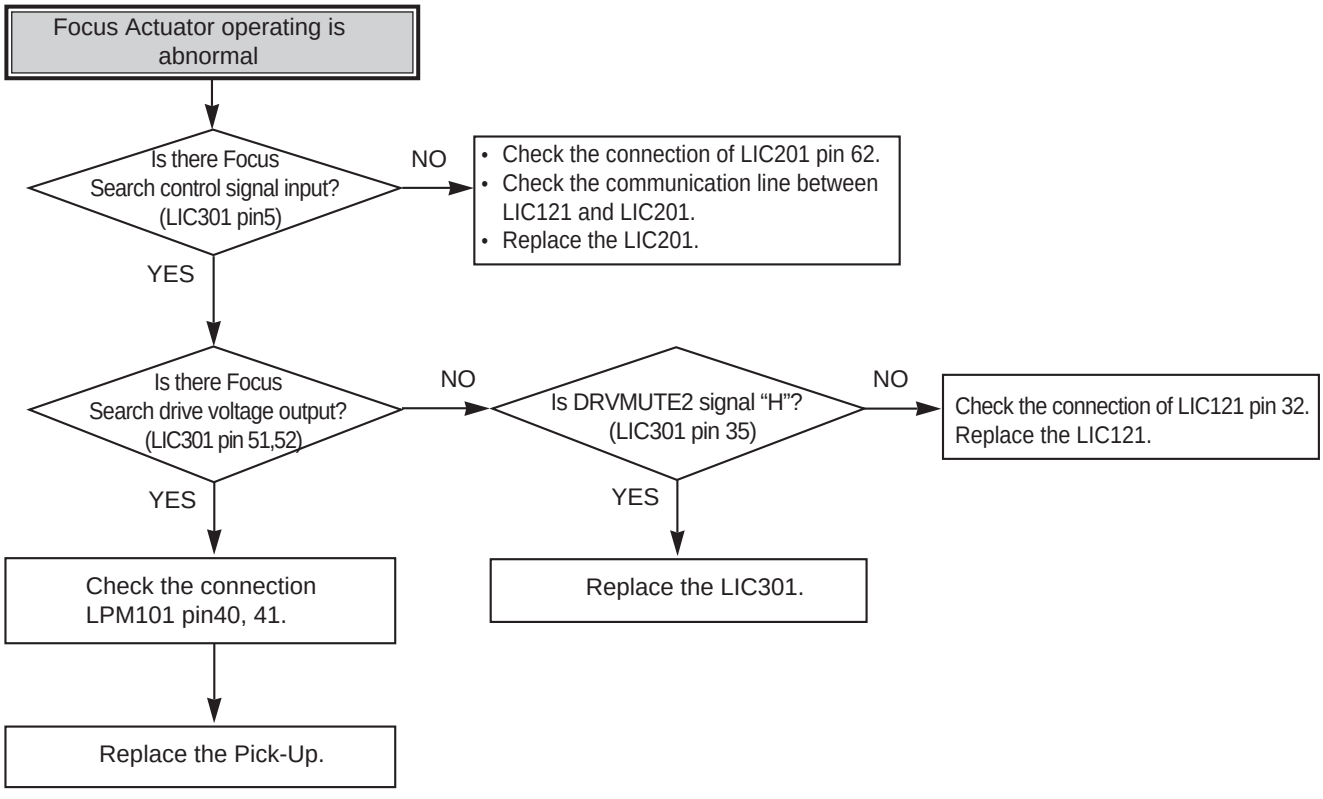

System Check.
Load tray without inserting disc.
YES
Does Tray operate normally?
NO
Go to “Tray operating is abnormal”
YES
Does Pick-up move to inside?
NO
Go to “Sled operating is abnormal”
YES
Does Pickup lens move up/down?
NO
Go to “Focus Actuator operating is abnormal”
YES
Does Laser turn on?
NO
Go to “Laser operating is abnormal”
YES
After eject tray, Insert CD-ROM Disc and check rotation.
YES
Does Disc rotate continuously and the drive recognize the disc?
NO
Go to “Recognition fail Case1 (CD-ROM Disc)”
YES
After eject the tray, Insert DVD Disc and check rotation.
YES
Does Disc rotate continuously and the drive recognize the disc?
NO
Go to :Recognition fail Case2 (DVD Disc)”
YES
After eject the tray, Insert DVD+R/RW Disc and check rotation.
YES
Does Disc rotate continuously and the drive recognize the disc?
NO
Go to :Recognition fail Case3 (Blank DVD+R/RW)”
OK

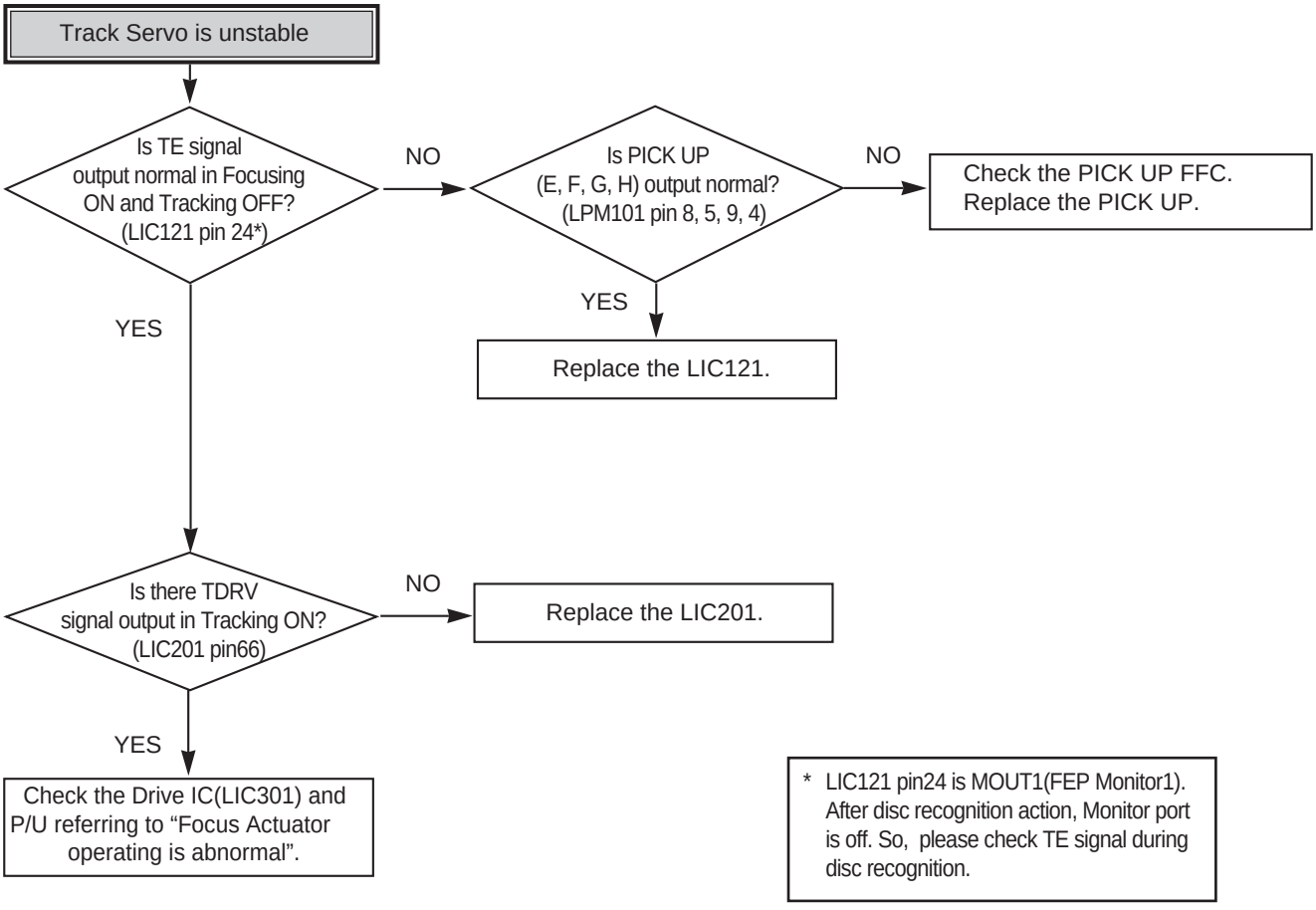

Tray operating is abnormal.
Tray open doesn't work.
YES
Is there Tray control signal input? (LIC301 pin 46)
NO
Check the connction of LIC201 pin 66.
Replace the LIC201.
Check the communication line between LIC201.
YES
Is there Tray drive voltage output? (LIC301 pin 1,2)
NO
WhenLPF303 is open, Is there Tray drive signal output?
Replace the LIC301.
YES
YES
Check the connctor (LPF303).

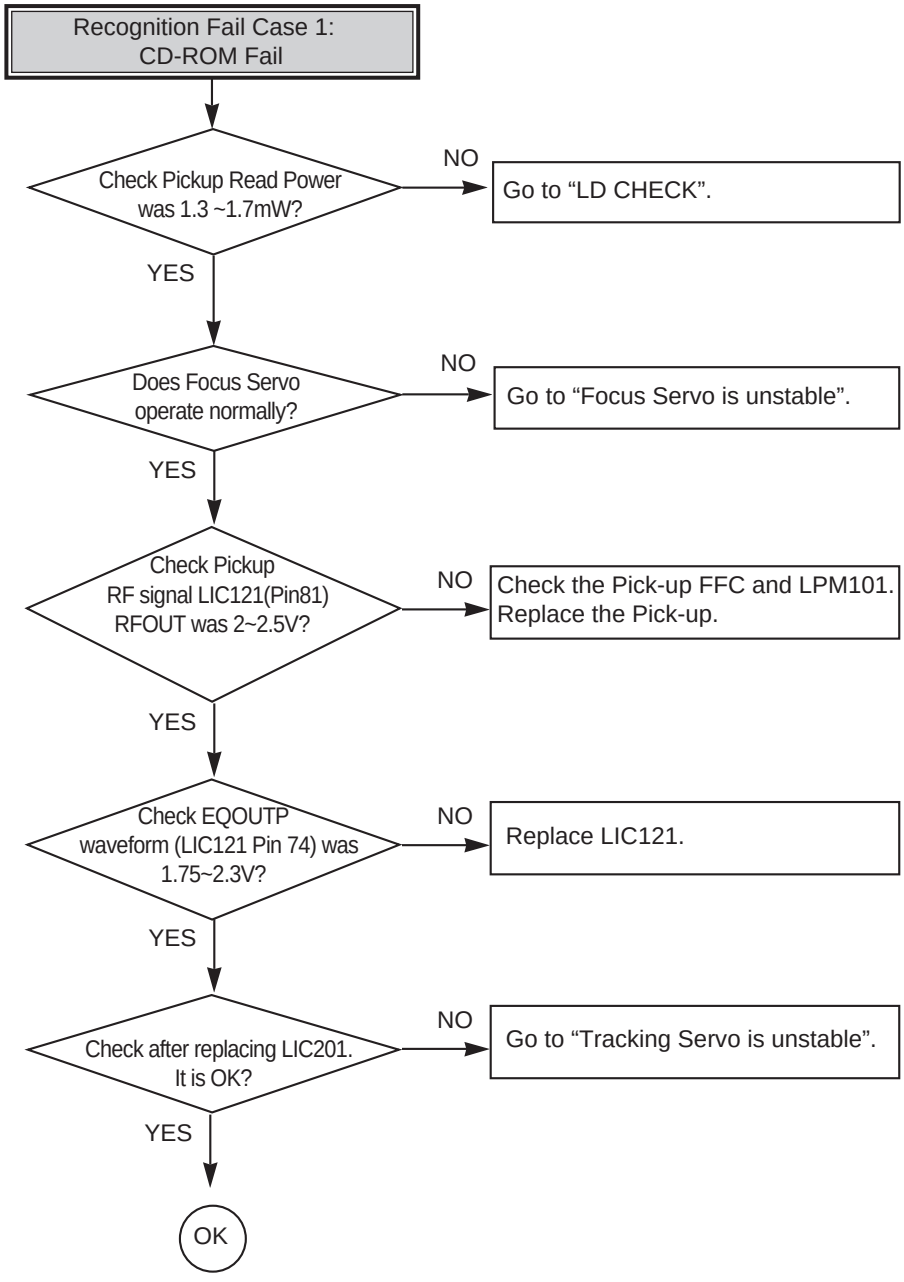

Sled operating i s abnormal.
Is there Sled control signal output? (LIC201 pin 68,69)
NO
Replace the LIC201.
YES
Is there Sled drive voltage input? (LIC301 pin 29,30)
NO
Check the LR316, LR317.
YES
Is there Sled drive voltage output? (LIC301 pin37,38,39,40)
NO
Is DRVMUTE2 signal 'H'? (LIC301 pin 35)
NO
Check the connection of LIC121 pin 32.
YES
YES
Replace the LIC301.
Replace the LIC121.
Is there Sled drive voltage output ? (LPM302 pin 1,2,3,4)
YES
Replace the Sled Motor.
NO
Check the Connection LCN302.

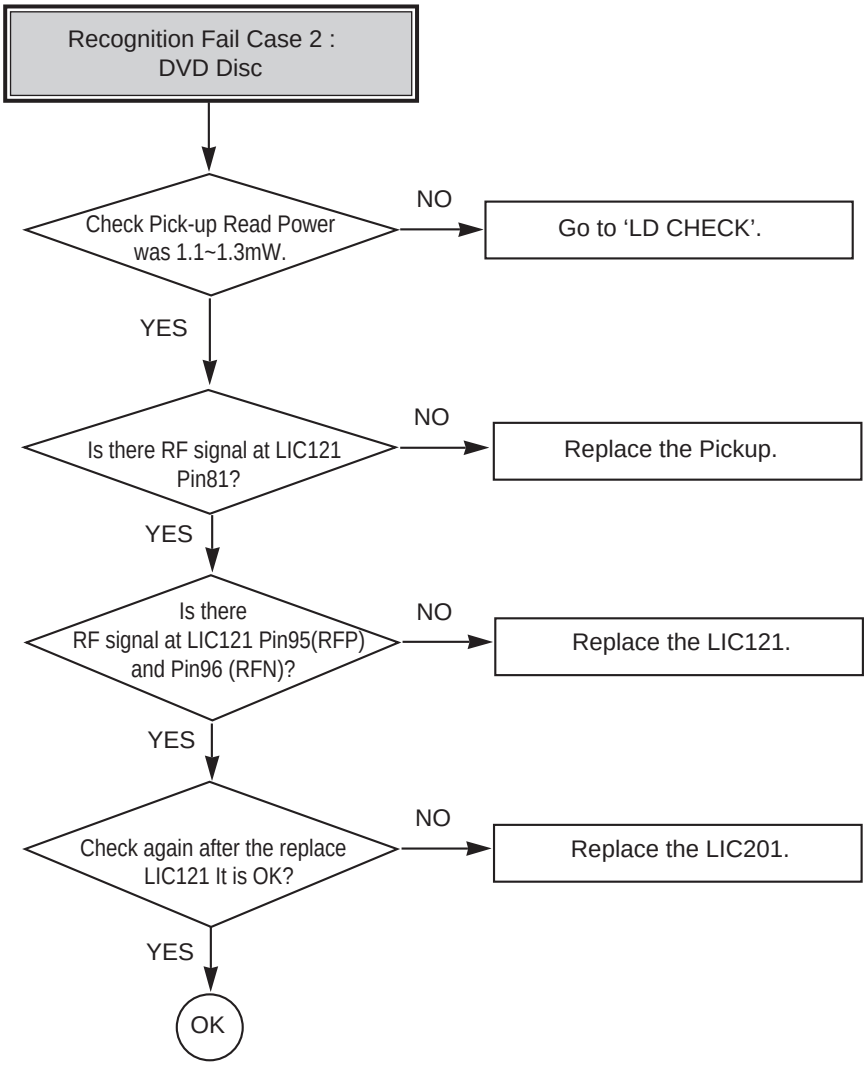

Spindle operating is abnormal
Is there
Spindle control DSP output?
(LIC201 pin70)
NO
Replace the LIC201.
YES
Is there
Spindle drive voltage output?
(LIC301 pin 11, 13, 16)
NO
Is there
FG signal input?
(LIC201 pin 71)
NO
Check the output of LIC301 pin 43.
Check the connector LPM301.
Replace the LIC301.
YES
YES
OK
Is there
Spindle drive voltage output?
(LIC301 pin 1, 2, 3)
YES
Replace the Spindle Motor.
NO
Check the Connection LPM301.

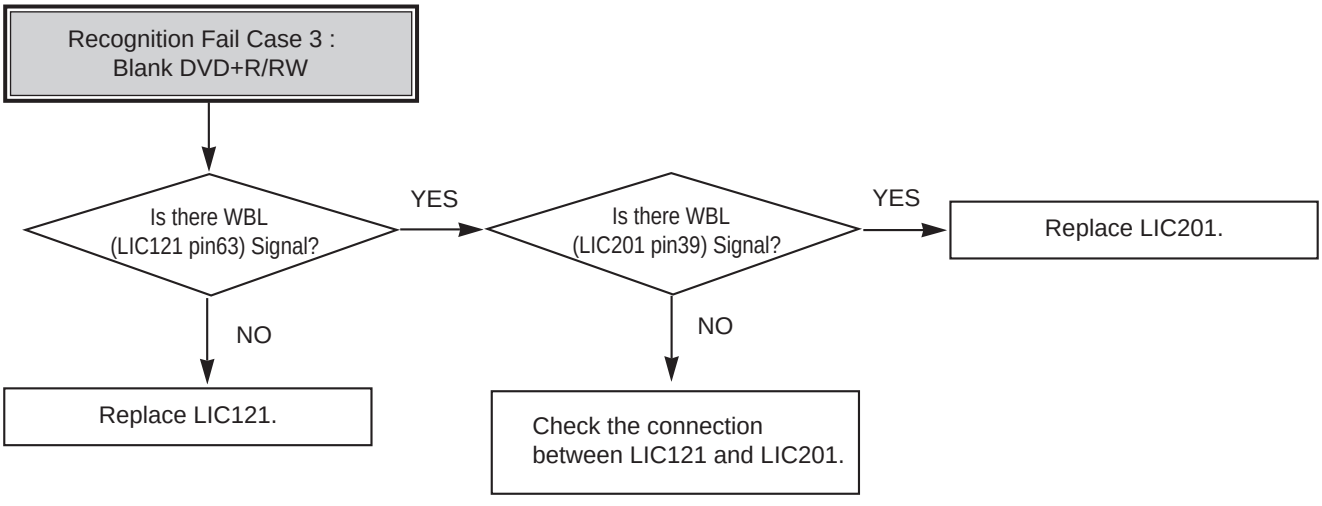

Focus Servo is unstable
Is FE signal output normal in Focusing Up/Down? (LIC121 pin25*)
NO
Check Pickup Read Power is 1.3~1.7mW?
NO
Replace the Pick up.
YES
Replace the LIC121.
Is FDRV signal output normal in Focusing Up/Down? (LIC201 pin 62)
NO
Replace the LIC201.
YES
Go to "Focus Actuator operating is abnormal"
* LIC121 pin25 is MOUT2(FEP Monitor2). After disc recognition action, Monitor port is off. So, please check FE signal during disc recognition.

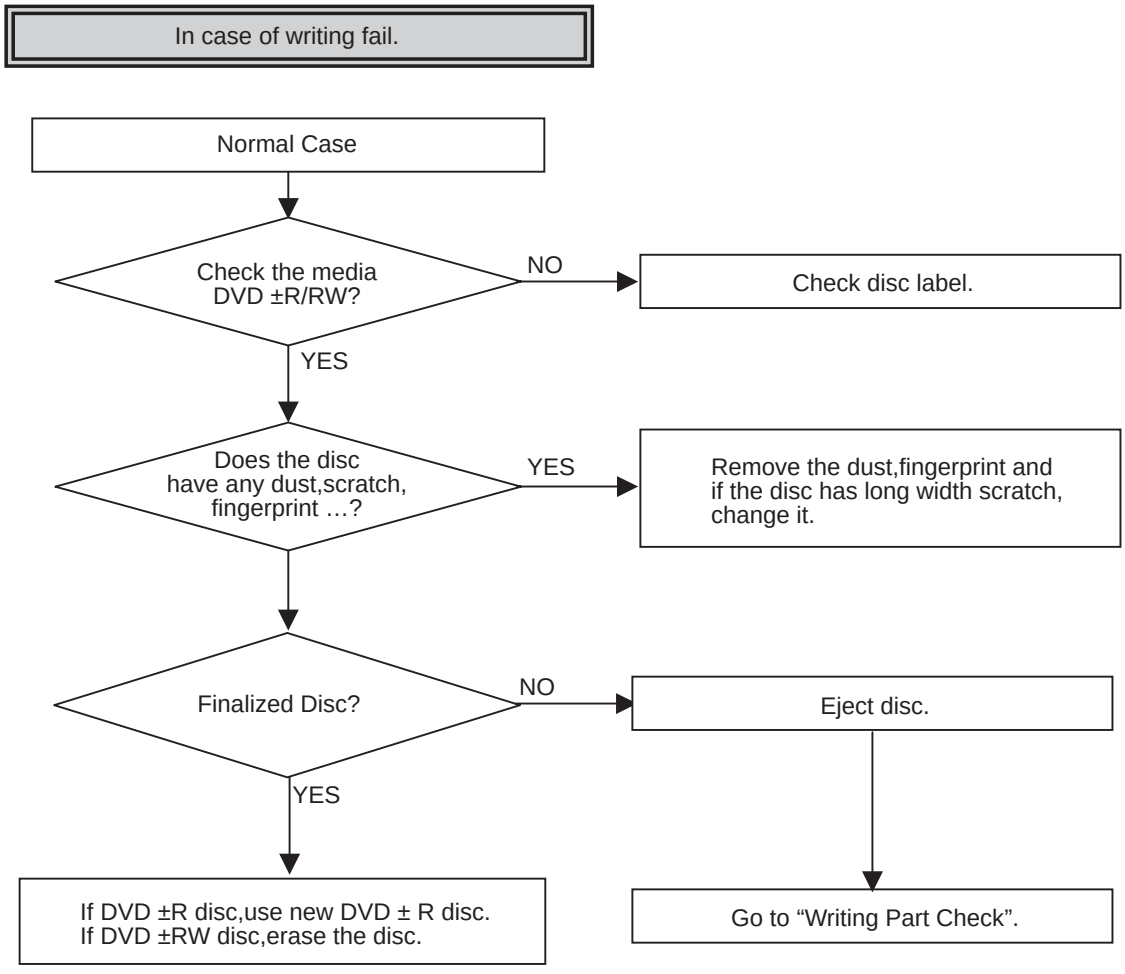

Focus Actuator operating is abnormal
Is there Focus Search control signal input? (LIC301 pin5)
NO
• Check the connection of LIC201 pin 62.
• Check the communication line between LIC121 and LIC201.
• Replace the LIC201.
YES
Is there Focus Search drive voltage output? (LIC301 pin 51,52)
NO
Is DRVMUTE2 signal "H"? (LIC301 pin 35)
NO
Check the connection of LIC121 pin 32.
Replace the LIC121.
YES
YES
Check the connection LPM101 pin40, 41.
Replace the LIC301.
Replace the Pick-Up.

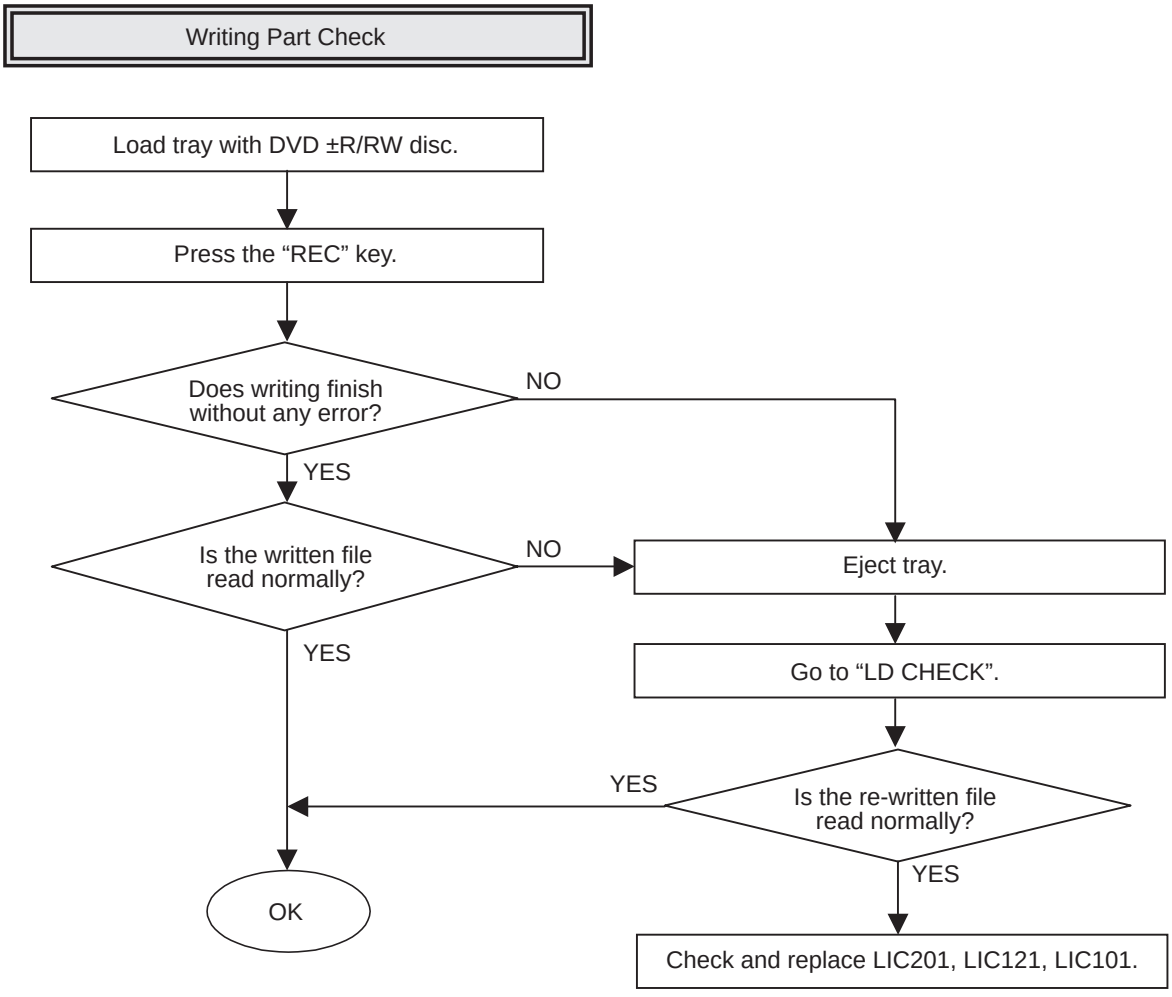

Track Servo is unstable
Is TE signal output normal in Focusing ON and Tracking OFF? (LIC121 pin 24*)
NO
Is PICK UP (E, F, G, H) output normal? (LPM101 pin 8, 5, 9, 4)
NO
Check the PICK UP FFC. Replace the PICK UP.
YES
Replace the LIC121.
YES
Is there TDRV signal output in Tracking ON? (LIC201 pin66)
NO
Replace the LIC201.
YES
Check the Drive IC(LIC301) and P/U referring to “Focus Actuator operating is abnormal”.
* LIC121 pin24 is MOUT1(FEP Monitor1). After disc recognition action, Monitor port is off. So, please check TE signal during disc recognition.

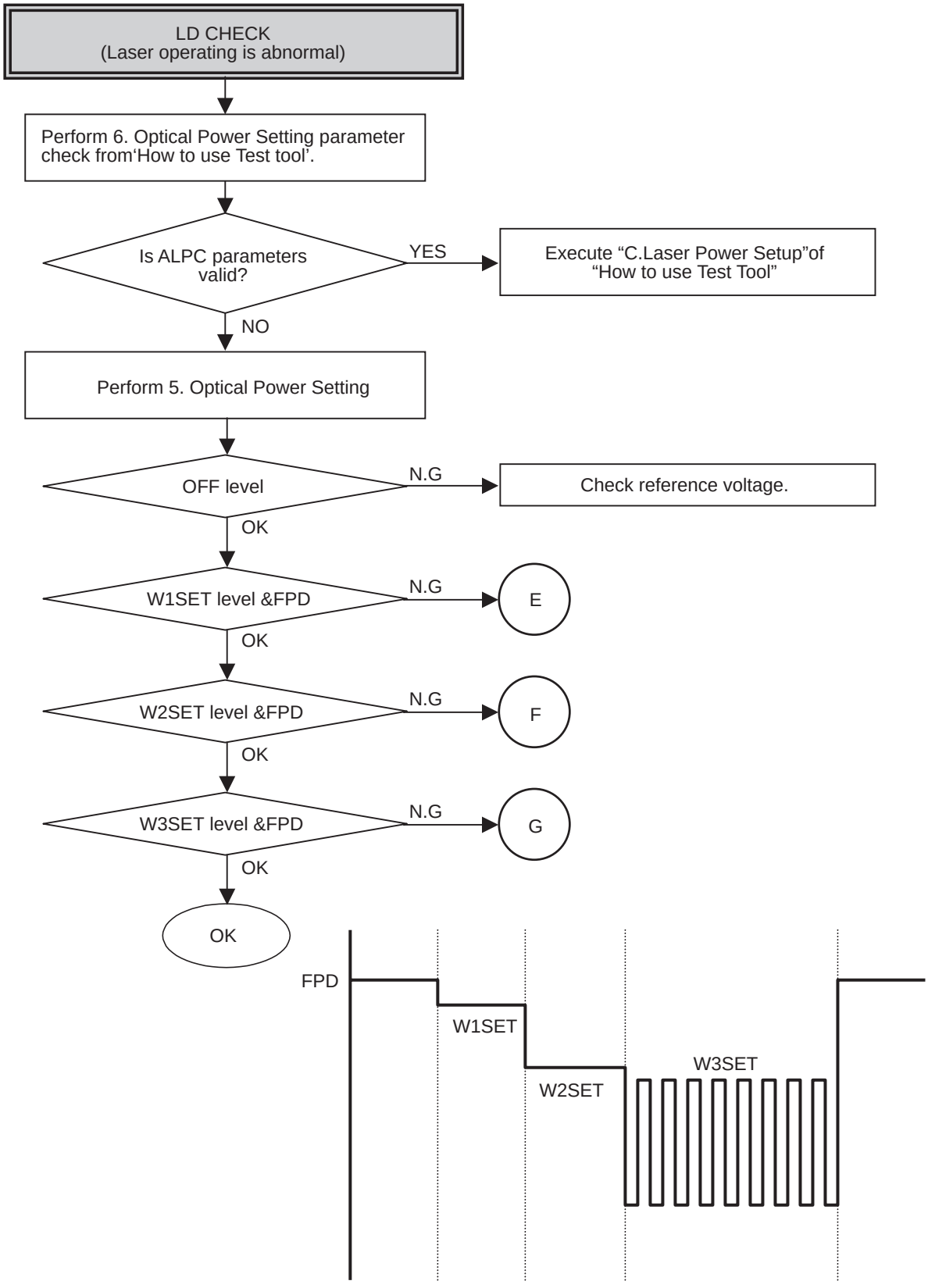

Recognition Fail Case 1:
CD-ROM Fail
Check Pickup Read Power was 1.3 ~1.7mW?
NO
Go to “LD CHECK”.
YES
Does Focus Servo operate normally?
NO
Go to “Focus Servo is unstable”.
YES
Check Pickup RF signal LIC121(Pin81) RFOUT was 2~2.5V?
NO
Check the Pick-up FFC and LPM101. Replace the Pick-up.
YES
Check EQOUTP waveform (LIC121 Pin 74) was 1.75~2.3V?
NO
Replace LIC121.
YES
Check after replacing LIC201. It is OK?
NO
Go to “Tracking Servo is unstable”.
YES
OK

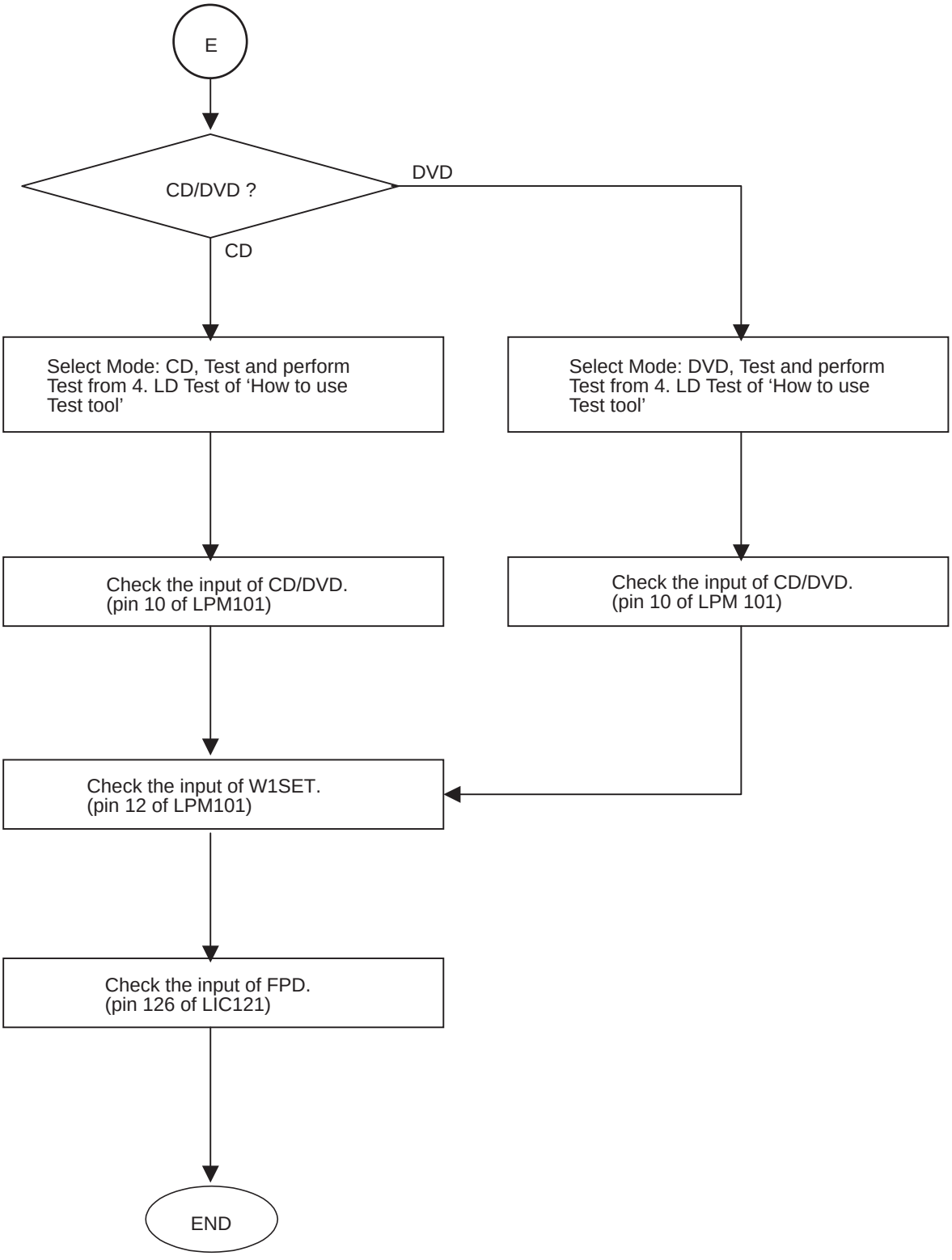

Recognition Fail Case 2 :
DVD Disc
Check Pick-up Read Power was 1.1~1.3mW.
NO
Go to 'LD CHECK'.
YES
Is there RF signal at LIC121 Pin81?
NO
Replace the Pickup.
YES
Is there RF signal at LIC121 Pin95(RFP) and Pin96 (RFN)?
NO
Replace the LIC121.
YES
Check again after the replace LIC121 It is OK?
NO
Replace the LIC201.
YES
OK

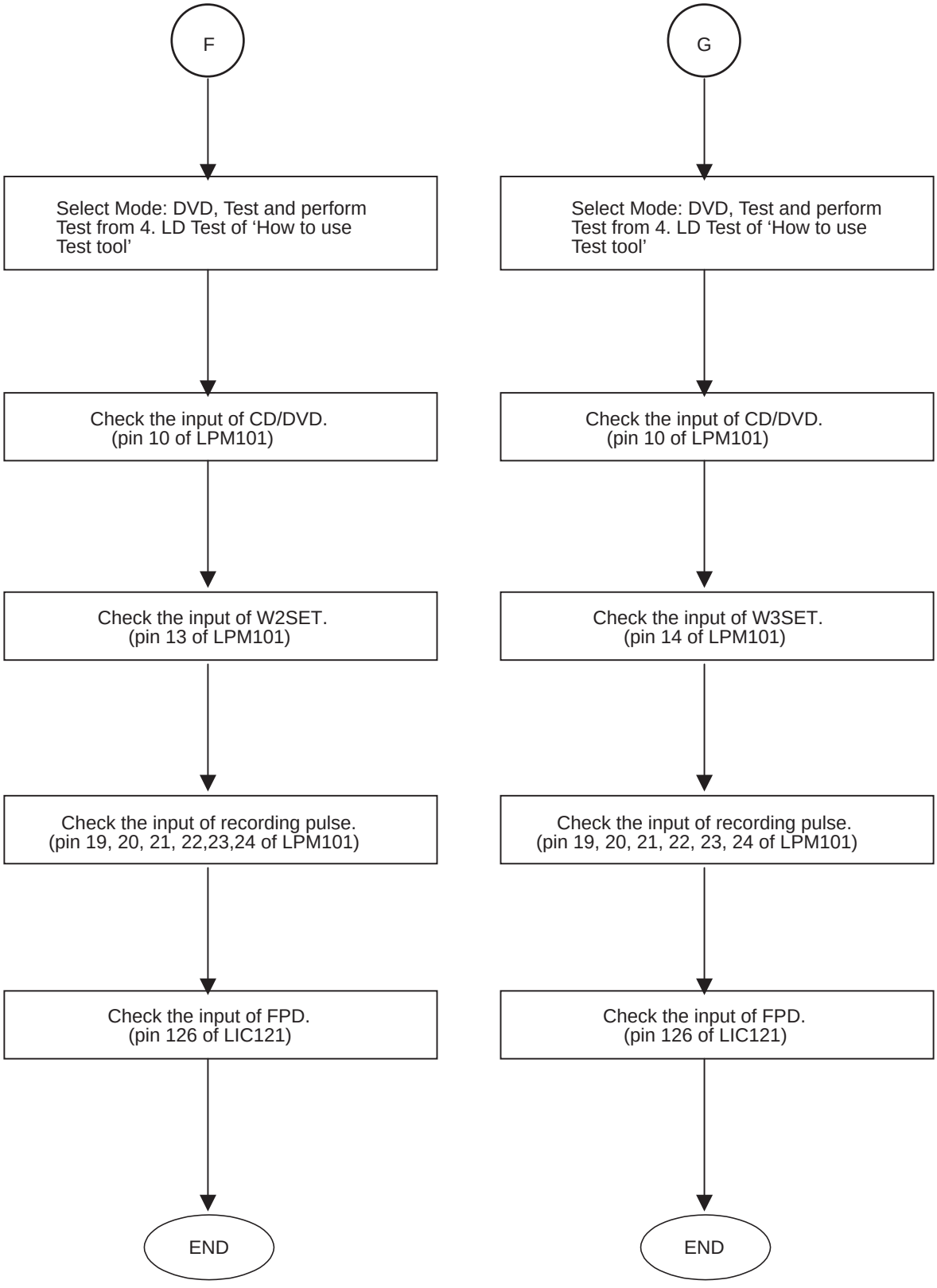

Recognition Fail Case 3 :
Blank DVD+R/RW
Is there WBL (LIC121 pin63) Signal?
YES
Is there WBL (LIC201 pin39) Signal?
YES
Replace LIC201.
NO
Replace LIC121.
NO
Check the connection between LIC121 and LIC201.


In case of writing fail.
Normal Case
Check the media
DVD ±R/RW?
NO
Check disc label.
YES
Does the disc
have any dust,scratch,
fingerprint …?
YES
Remove the dust,fingerprint and
if the disc has long width scratch,
change it.
Finalized Disc?
NO
Eject disc.
YES
If DVD ±R disc,use new DVD ± R disc.
If DVD ±RW disc,erase the disc.
Go to “Writing Part Check”.


Writing Part Check
Load tray with DVD ±R/RW disc.
Press the “REC” key.
Does writing finish without any error?
NO
YES
Is the written file read normally?
NO
Eject tray.
YES
Go to “LD CHECK”.
Is the re-written file read normally?
YES
YES
OK
Check and replace LIC201, LIC121, LIC101.


LD CHECK
(Laser operating is abnormal)
Perform 6. Optical Power Setting parameter check from'How to use Test tool'.
Is ALPC parameters valid?
YES
Execute "C.Laser Power Setup"of "How to use Test Tool"
NO
Perform 5. Optical Power Setting
OFF level
N.G
Check reference voltage.
OK
W1SET level &FPD
N.G
E
OK
W2SET level &FPD
N.G
F
OK
W3SET level &FPD
N.G
G
OK
OK
FPD
W1SET
W2SET
W3SET

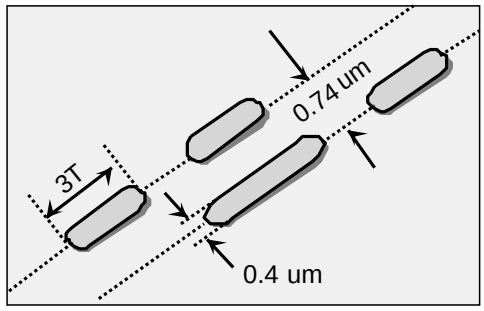

E
CD/DVD ?
DVD
CD
Select Mode: CD, Test and perform Test from 4. LD Test of 'How to use Test tool'
Select Mode: DVD, Test and perform Test from 4. LD Test of 'How to use Test tool'
Check the input of CD/DVD. (pin 10 of LPM101)
Check the input of CD/DVD. (pin 10 of LPM 101)
Check the input of W1SET. (pin 12 of LPM101)
Check the input of FPD. (pin 126 of LIC121)
END

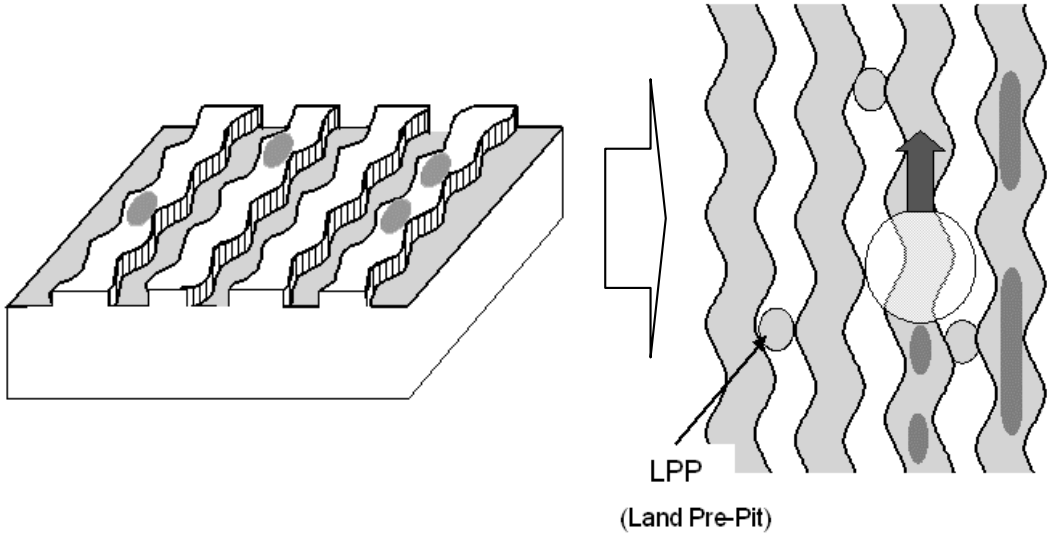

F
Select Mode: DVD, Test and perform Test from 4. LD Test of 'How to use Test tool'
Check the input of CD/DVD. (pin 10 of LPM101)
Check the input of W2SET. (pin 13 of LPM101)
Check the input of recording pulse. (pin 19, 20, 21, 22,23,24 of LPM101)
Check the input of FPD. (pin 126 of LIC121)
END
G
Select Mode: DVD, Test and perform Test from 4. LD Test of 'How to use Test tool'
Check the input of CD/DVD. (pin 10 of LPM101)
Check the input of W3SET. (pin 14 of LPM101)
Check the input of recording pulse. (pin 19, 20, 21, 22, 23, 24 of LPM101)
Check the input of FPD. (pin 126 of LIC121)
END

THE DIFFERENCE OF DVD-R/RW, DVD+R/RW DISCS AND DVD-ROM

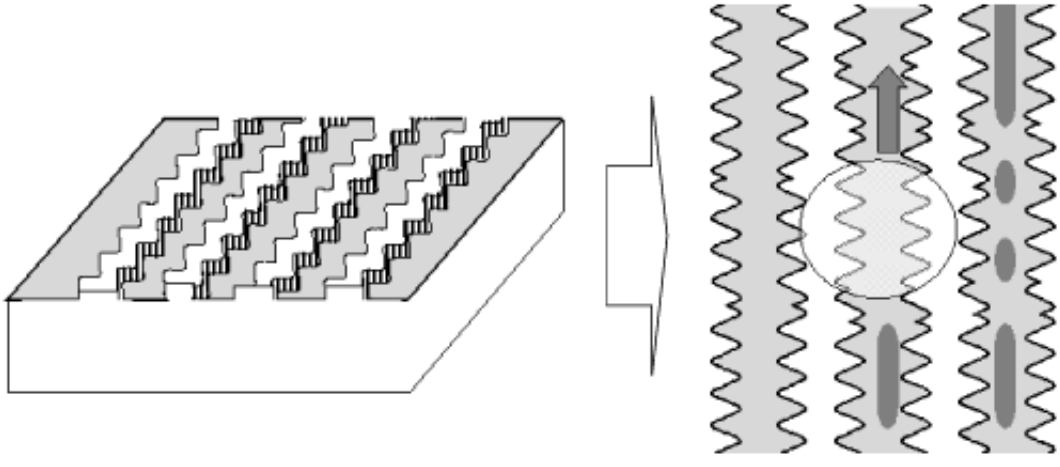
1. RECORDING LAYER

- **DVD-ROM (Read Only Disc)**





- **DVD+R/RW Disc**



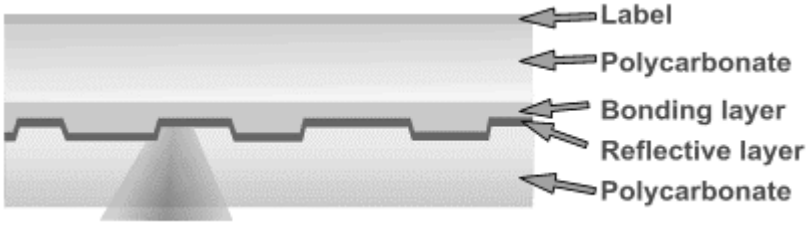
2. DISC SPECIFICATION

	DVD-ROM		DVD-R	DVD-RW	DVD+R	DVD+RW
	Single-Layer	Dual-Layer				
Media Type	Read Only	Read Only	Dye	Phase change	Dye	Phase change
User data capacity	4.7GB	8.54GB	4.7GB	4.7GB	4.7GB	4.7GB
Wavelength	650nm	650nm	650nm	650nm	650nm	650nm
Reflectivity	45~85%	18~30nm	45~85%	18~30%	45~85%	18~30nm
Track pitch	0.74μm	0.74μm	0.74μm	0.74μm	0.74μm	0.74μm
Minimum pit length	0.4μm	0.4μm	0.4μm	0.4μm	0.4μm	0.4μm
Modulation	>0.6	>0.6	>0.6	>0.6	>0.6	>0.6
Channel bit-rate	26.16MHz	26.16MHz	26.16MHz	26.16MHz	26.16MHz	26.16MHz
Wobble Frequency	–	–	140KHz	140KHz	817.4KHz	817.4KHz
Addressing	26.16MHz	26.16MHz	Wobble & LPP	Wobble & LPP	Wobble(ADIP)	Wobble(ADIP)
Read Power (mW)					0.7 ± 0.1	0.7 ± 0.1
Write Power (mW)	–					
JItter	<8%	<8%	<8%	<8%	<9%	<9%

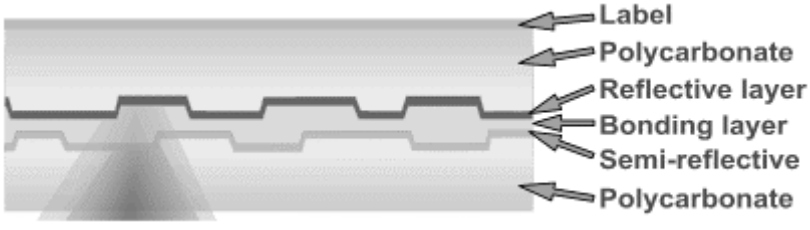
3. DISC MATERIALS

1) DVD-ROM

< Single Layer >



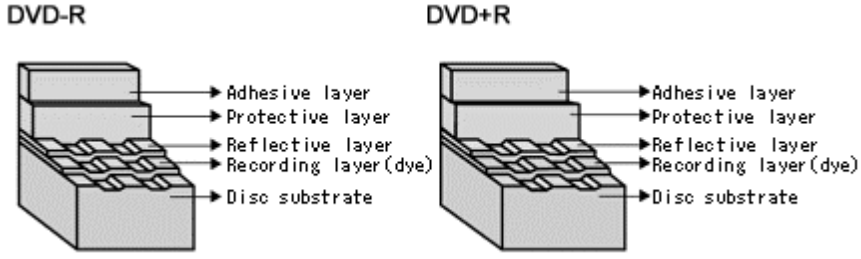
< Dual Layer >



2) Recording format using organic dye material (DVD-R / DVD+R)

The format that records data through the creation of recorded marks by changing the organic dye material with a laser beam.

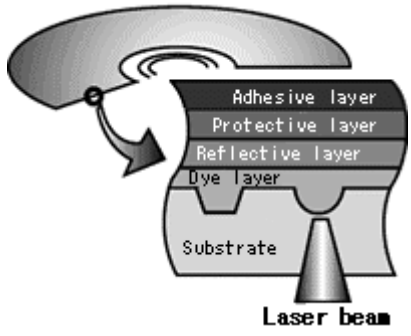
► Disc structure



► Recording principles

[Recording]
Recording is done by changing the organic dye layer and the substrate with a laser When a strong laser is applied to a disc, the temperature of the organic dye material goes up, the dye is decomposed and the substrate changes at the same time. At this time, a durable bit is created as is the case with a CD-ROM.

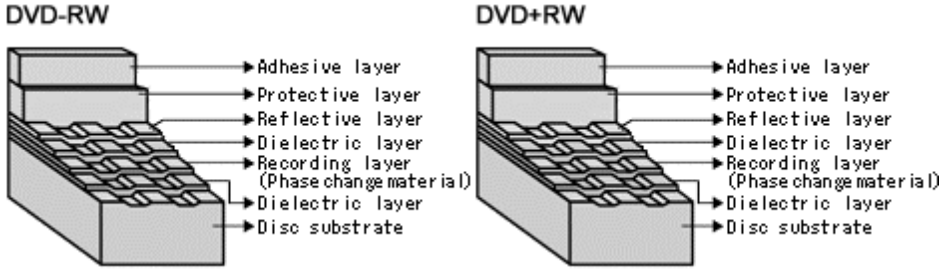
[Playback]
Signals are read with the differences of the reflection of a laser from pits.



3) Recording format using phase-change recording material (DVD-RW / DVD+RW)

• Data is recorded by changing the recording layer from the amorphous status to the crystalline status, and played back by reading the difference of the reflection coefficient.
Amorphous: Non-crystalline.

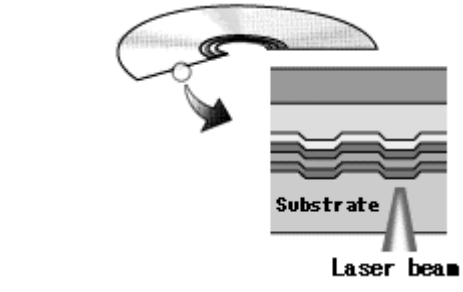
► Disc structure

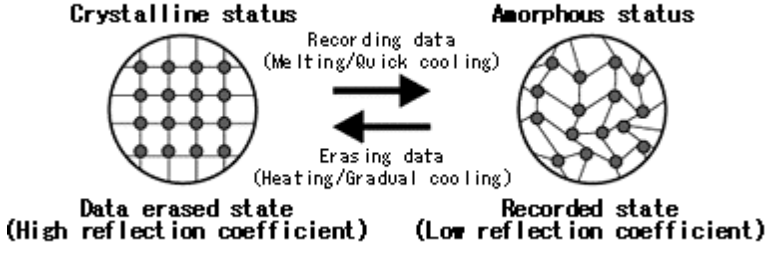


► Recording principles

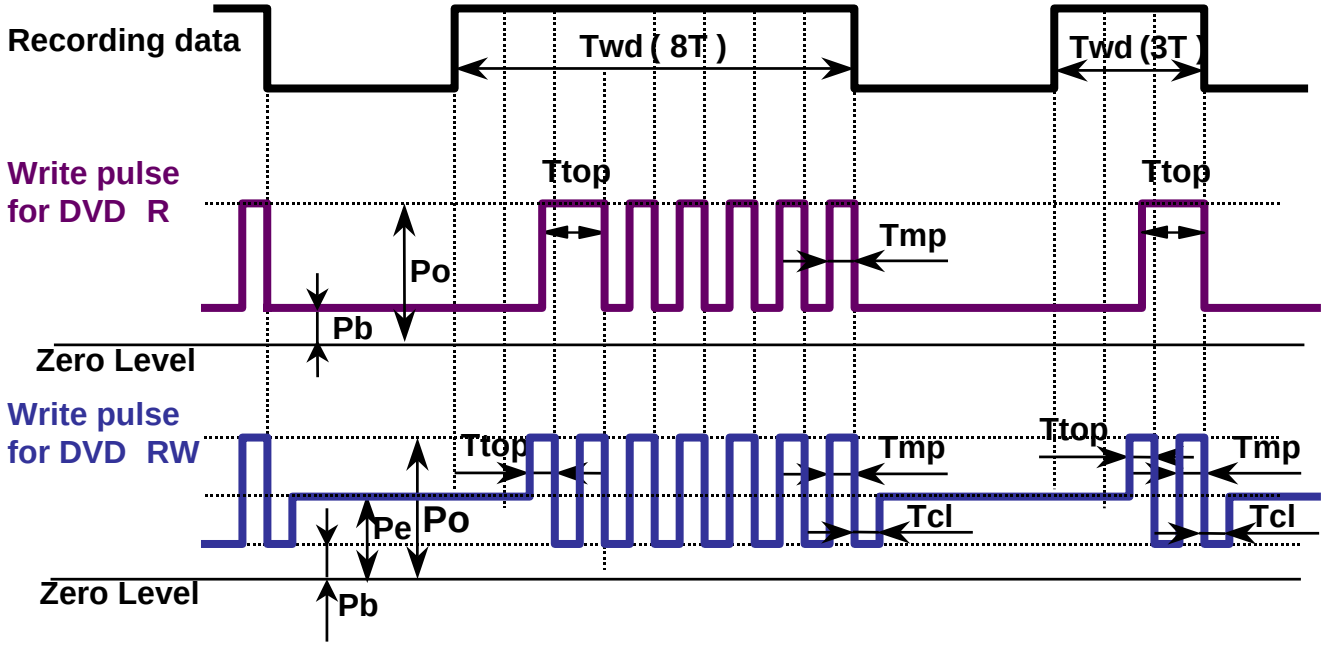
[Recording]
When a high-power laser is applied to the recording material, it melts and then becomes amorphous with a low reflection coefficient when it quickly cools off. When a mid-power laser is applied to heat gradually the recording material and then gradually cools it off, it becomes crystal with a high reflection coefficient.

[Playback]
A low-power laser is used for playback. The amount of reflected light depends on the status (amorphous or crystalline) of the recording material. This is detected by an optical sensor.





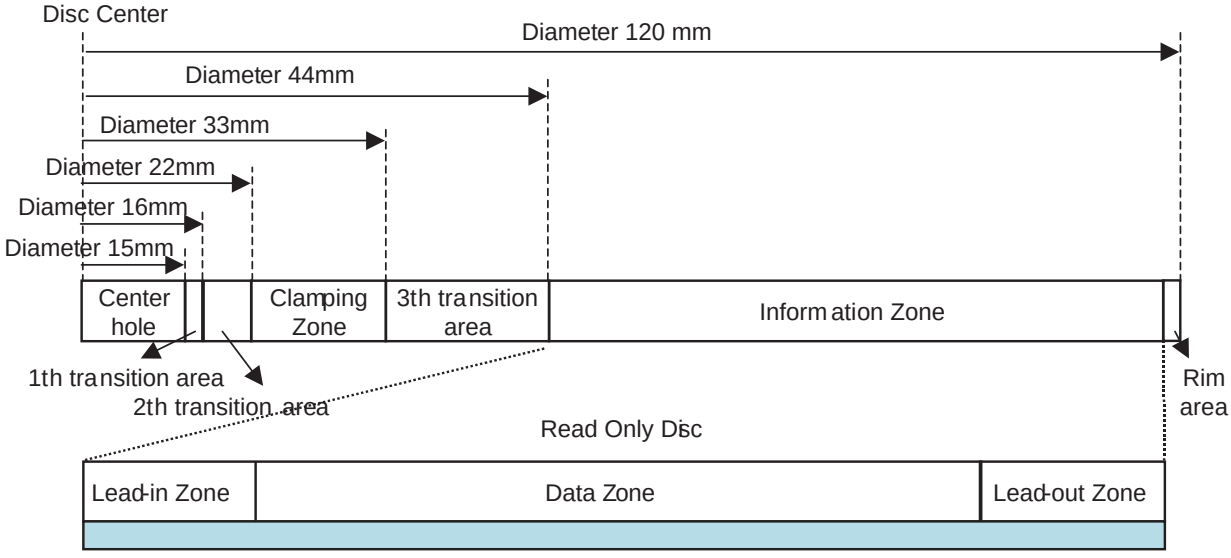
To make recordings, it is necessary to modulate the write pulse, which is called “Write Strategy”.
There can be many types in Write Strategy. Typically Write Strategy for DVD ±R has NMP(Non Multi-Pulse) type and MP(Multi-Pulse) type. In NMP type each single mark is created by subsequent separated short pulses. In MP type each single mark is created by one continuous pulse.
Write Strategy for DVD ±RW has Type 1 and Type2. In Type 1 the mark with nT width is created by one top pulse and (n-2) multi-pulses. Thus mark 3T is made by one top pulse and one multi-pulse. In Type 2 the mark with nT width is created by one top pulse and (n-3) multi-pulses. Thus mark 3T is made by one top pulse only.
RL-02A uses MP type Write Strategy for DVD ±R and Type 1 for DVD ±RW as shown below.



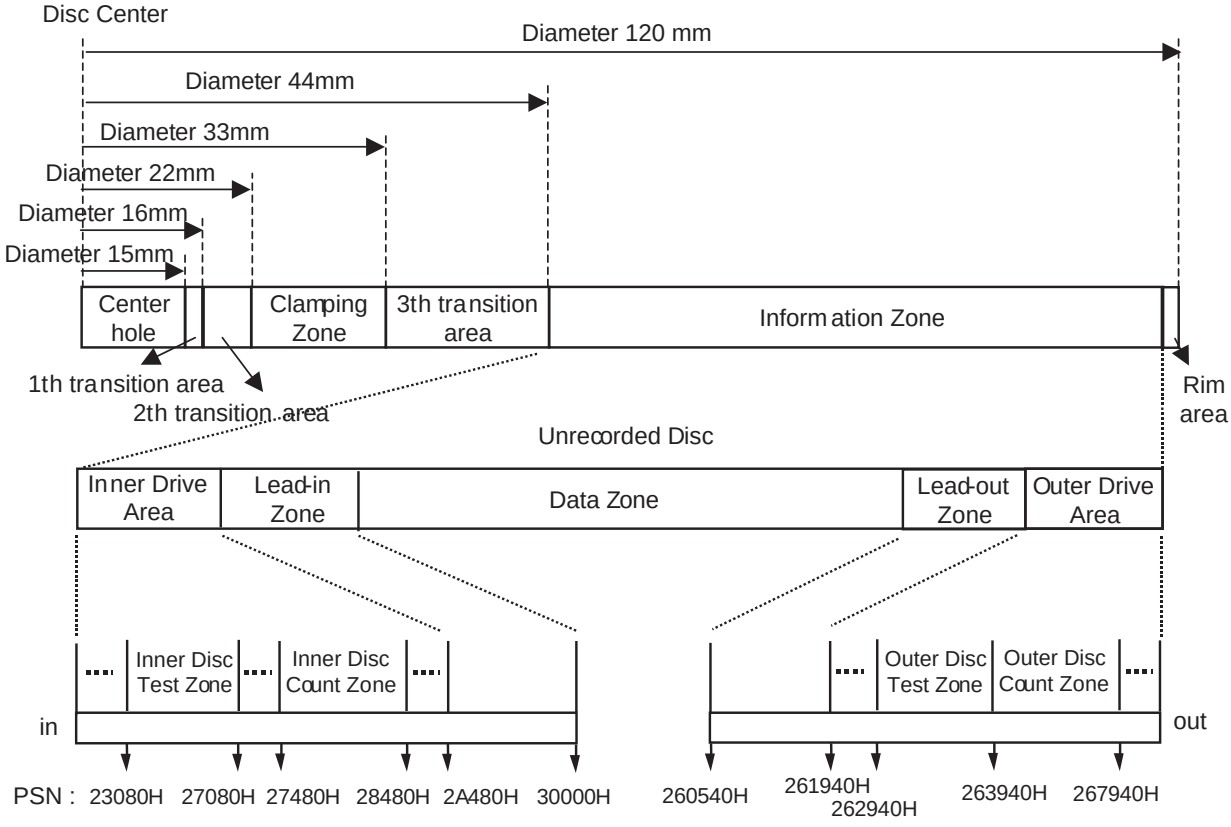
Po :Write Power (Peak Power)
Pe :Erase Power
Pb :Bias Power

4. ORGANIZATION OF THE INNER DRIVE AREA, OUTER DRIVE AREA, LEAD-IN ZONE AND LEAD-OUT ZONE

1) Layout of DVD-ROM disc

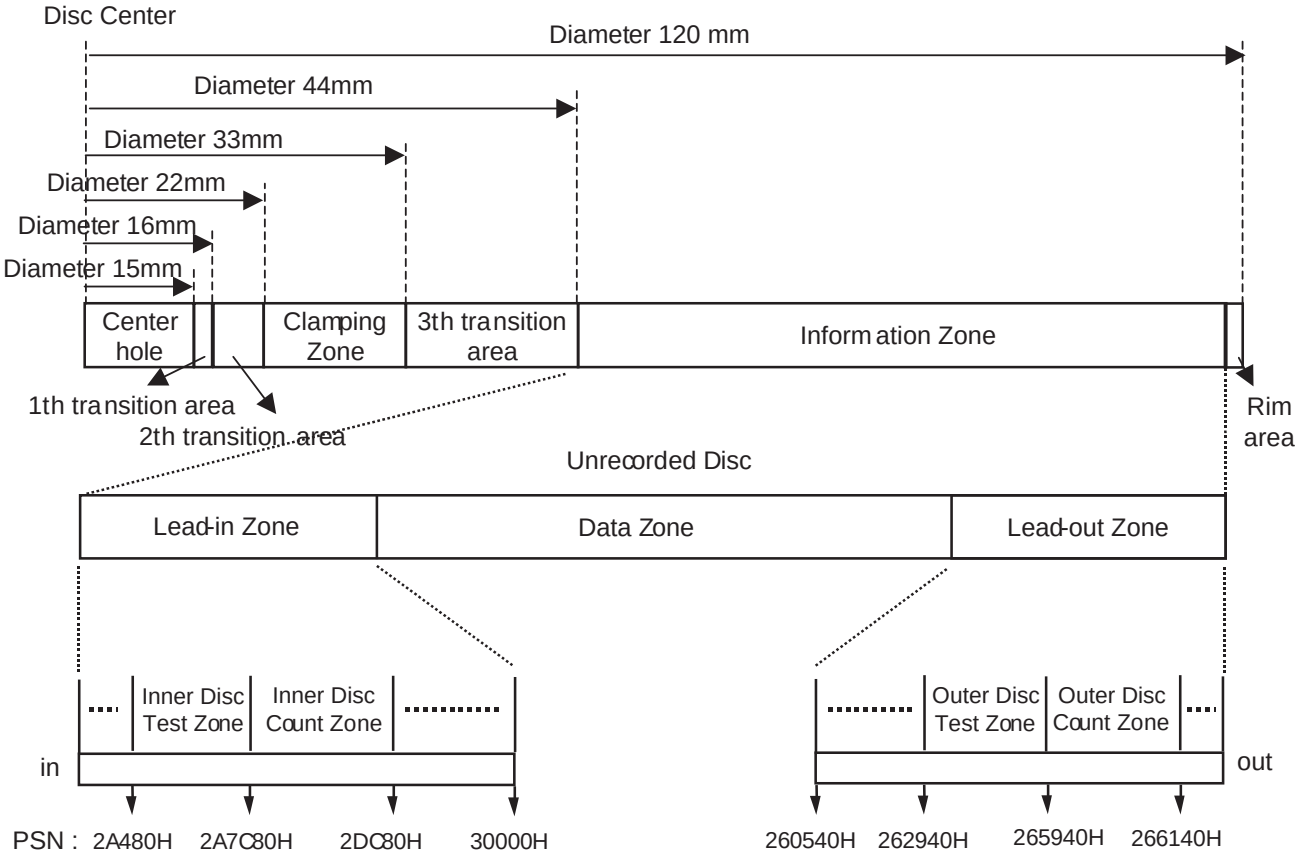


2) Layout of DVD+R disc



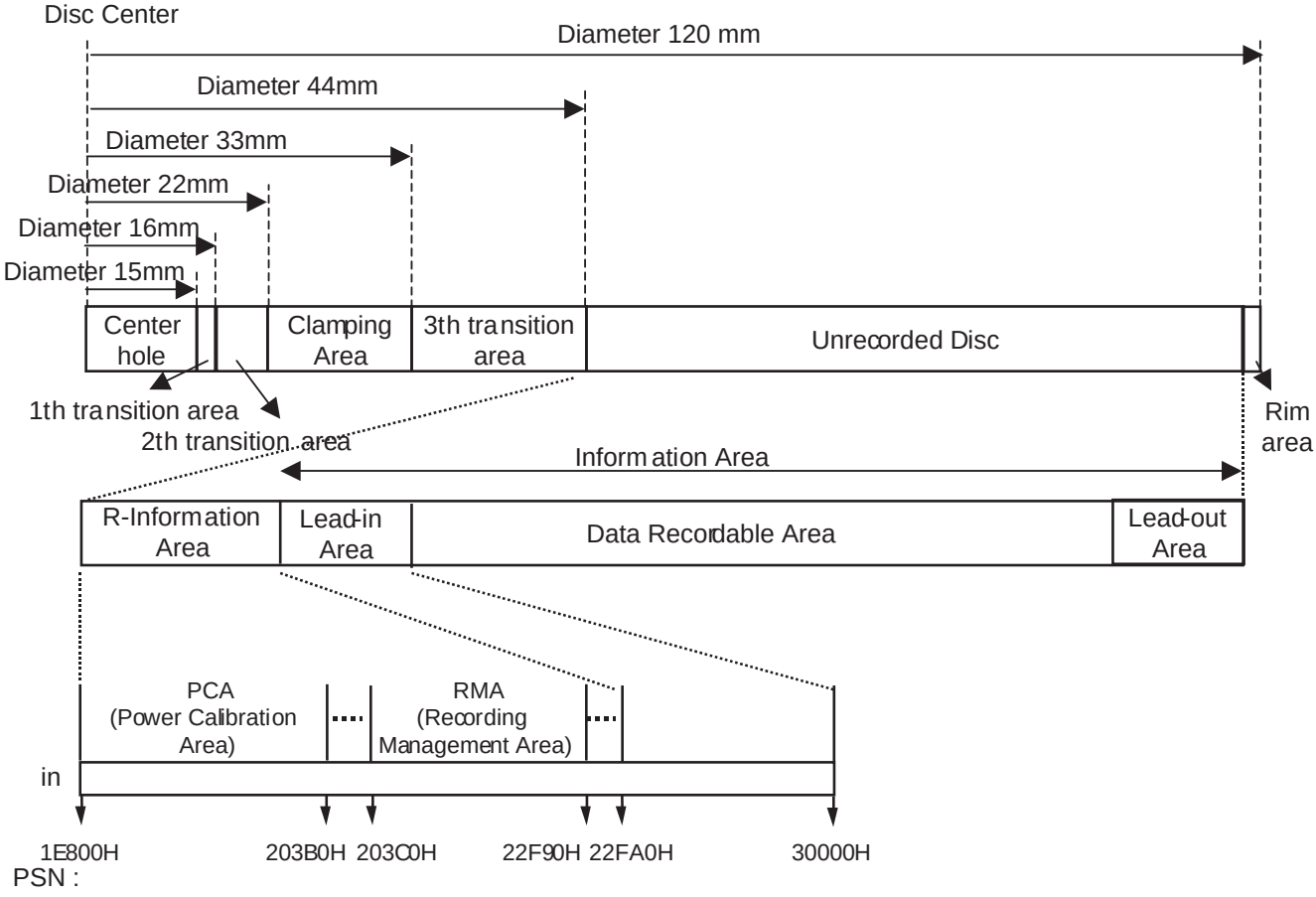
Inner Disc Test Zone : for performing OPC procedures.
Inner Disc Count Zone : For counting the number of OPC algorithm performed in IDT Zone.
Outer Disc Test Zone : for performing OPC procedures.
Outer Disc Count Zone : For counting the number of OPC algorithm performed in IDT Zone.

3) Layout of DVD+RW disc



Inner Disc Test Zone : for performing OPC procedures.
Inner Disc Count Zone : For counting the number of OPC algorithm performed in IDT Zone.
Outer Disc Test Zone : for performing OPC procedures.
Outer Disc Count Zone : For counting the number of OPC algorithm performed in IDT Zone.

4) Layout of DVD-R/RW disc



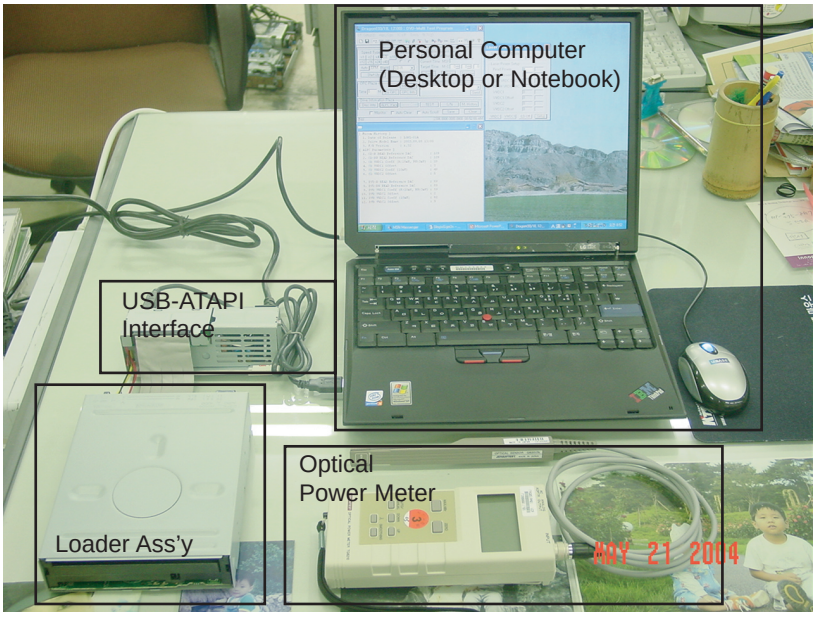
HOW TO USE TEST TOOL

1. ALPC MEASUREMENT SYSTEM

We need basically several measurement instrument to adjust Optical Power of CD and DVD Disc

- **ESSENTIAL INSTRUMENT**
  1) Optical Power meter & Sensor (ADVANTEST, TQ8230/Q82014A)
  2) Personal Computer
  3) Adjustment Program (Dragon or ALPC) --> being recommended ALPC Program in case of SVC

- **OPTIONAL INSTRUMENT**
  1) USB-ATAPI Interface (if you don't have Notebook which has ATAPI Interface or use PC USB Port)
  2) Connector-ATAPI Interface Board



2. ALPC PROGRAM

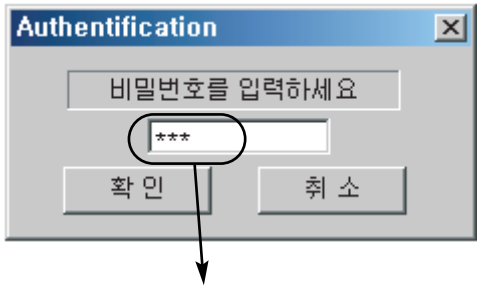
Use the ALPC program in Dragon tool for Optical power setting. It is consist of total 4 files.

Dragon_JW3P.exe
dragon.cfg
blue.dat
WNASPI32.DLL

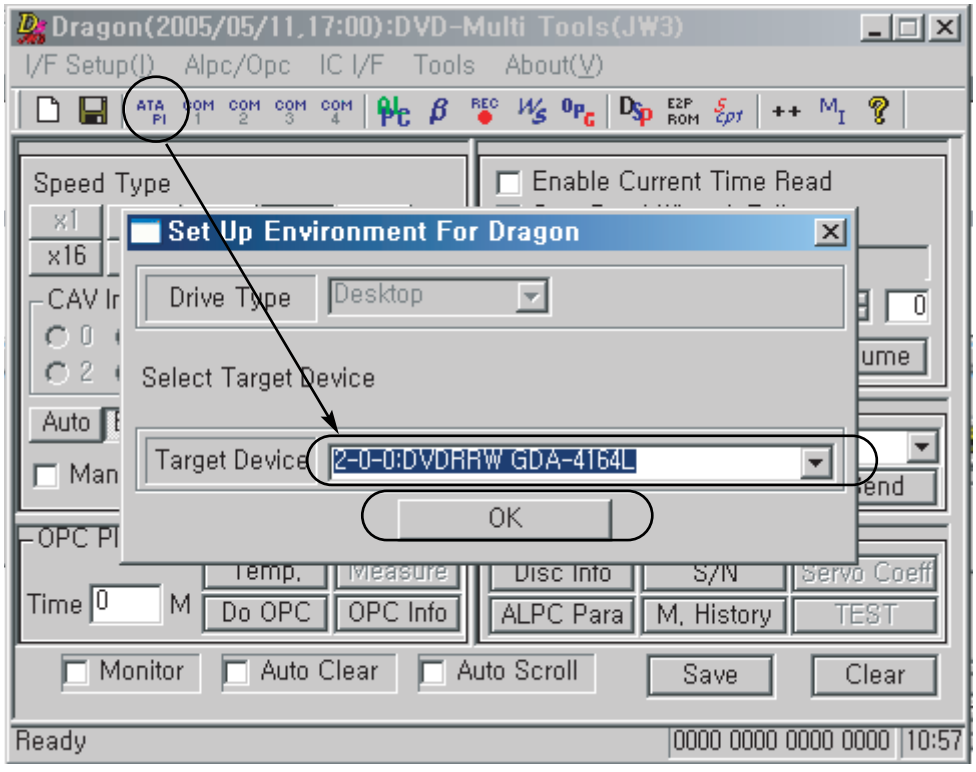
Four files must exist in same Directory.

3. EXECUTE ALPC PROGRAM

1) Execute Dragon_JW3P.exe file.

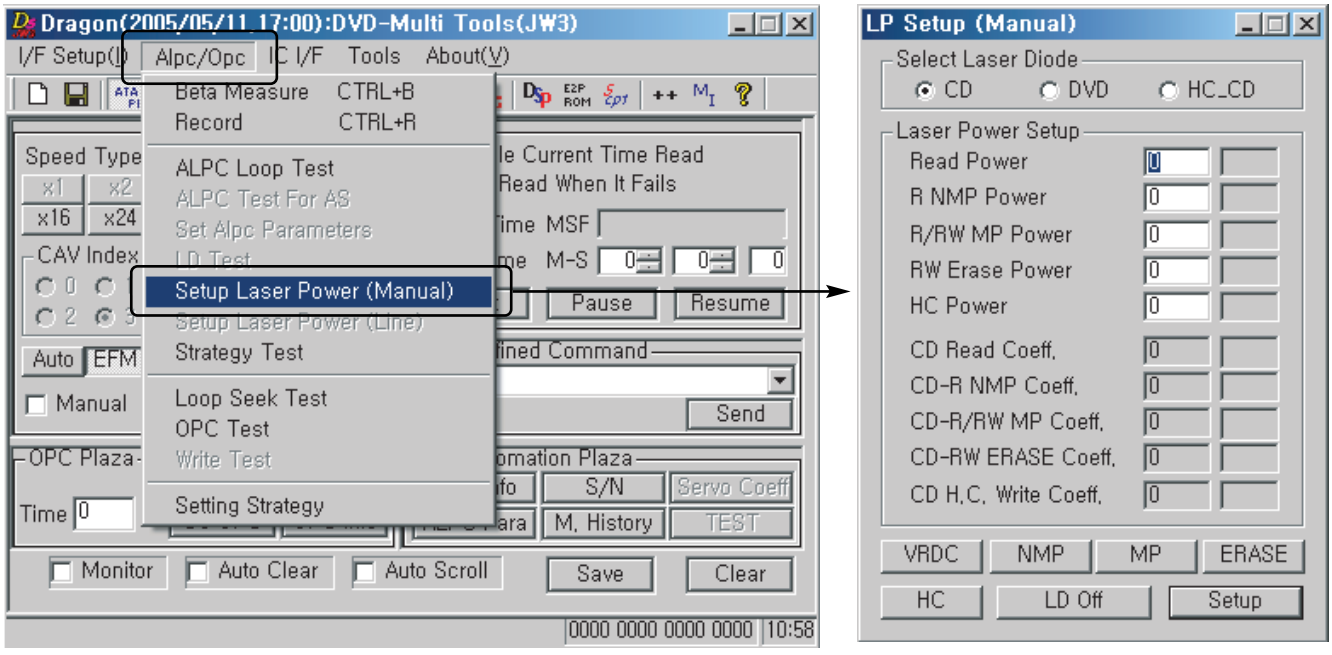


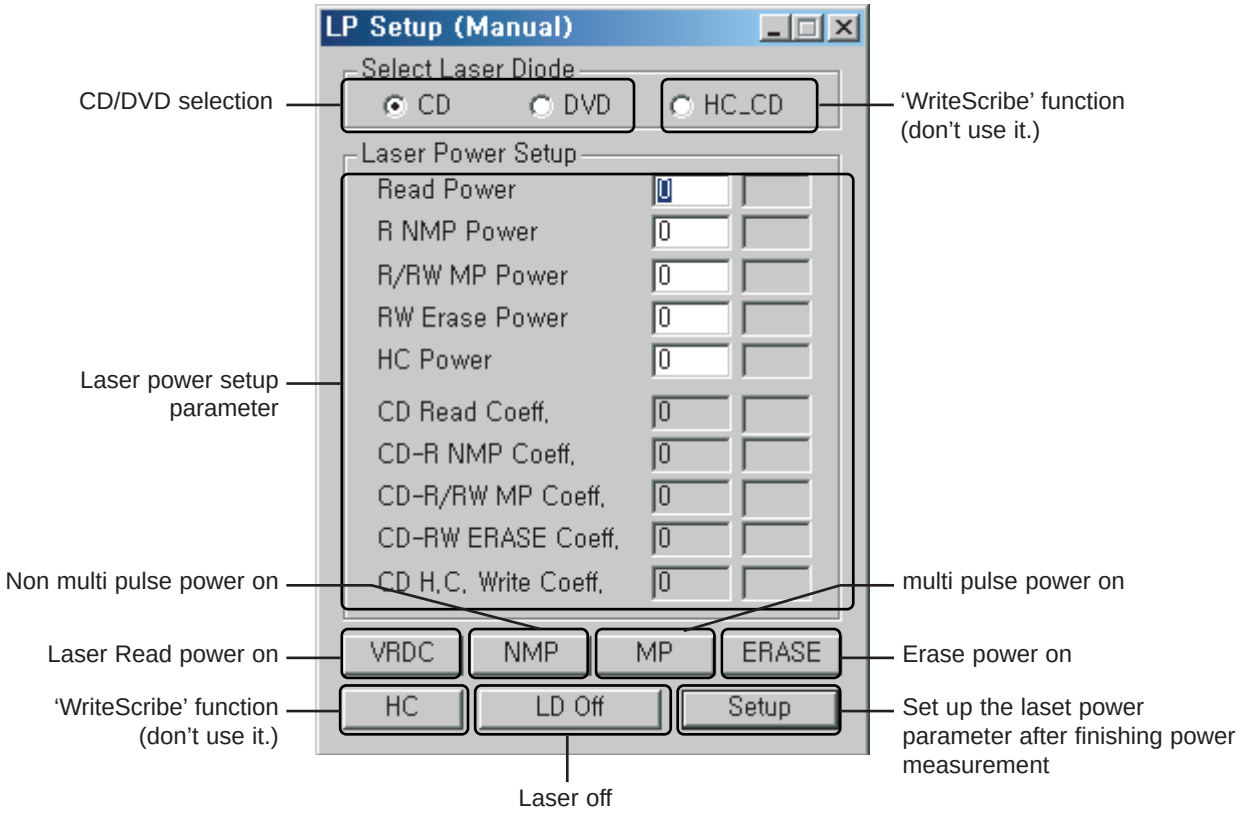
2) Enter the password. It is ‘qaz’.
When you enter the password, turn off the ‘Caps lock’ in your keyboard.



3) Set up the target device.
Press ‘ATAPI’ button on the main dialog of Dragon tool. And find the target device which is GDA-4164L.

4) If the target device setting is completed, execute the ‘Setup Laser Power(Manual)’ in the ‘Alpc/Opc’ menu.



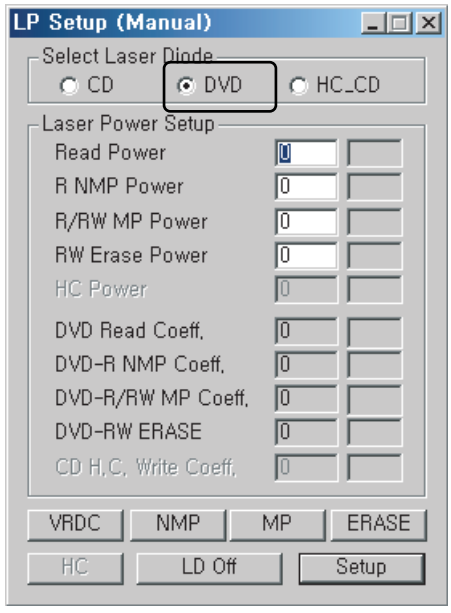


4. OPTICAL POWER SETTING

<Test for checking DVD LD and CD LD>

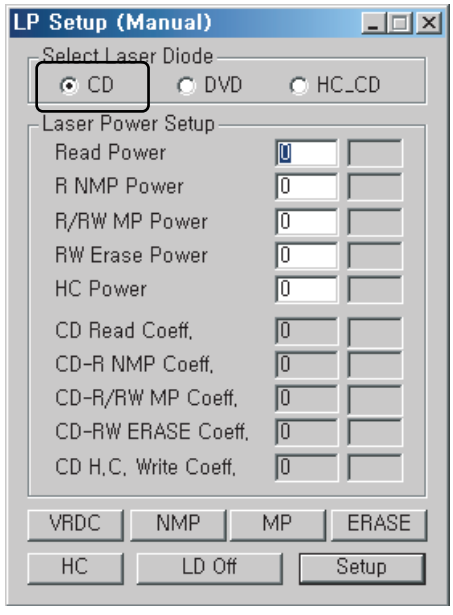
When you change the Travers ass°Øy(including pick-up) or loader PCB, you must do the laser power setting to match pick-up and loader PCB.

1) DVD LD power setting



- Select the DVD in the 'Select Laser Diode'
- Press VRDC (Read Power On, Strong Read light)
- Measure optical read Power.
- Write read power value.
- In case of NMP MP ERASE ,
  you are able to measure the power through same procedure.
  (caution) Don't watch light directly.
- When you finish optical power measurement,
  press LD Off button(LD Off).
- Press Setup button.(save to ERPROM)

2) CD LD Power Setting



- Select the CD in the 'Select Laser Diode'
- Press VRDC .
- Measure optical read Power.
- Write Read Power value.
- Press Setup button(save to ERPROM)

*** In case of CD power setting of RS-01A, loader don't need to set up write power.
Although NMP, MP,Erase and HC power is N.G when you press setup, please ignore the N.G message.
Because of RS-01A only support reading function about CD-R/RW.

* Look at reference sheet to test Optical Power.
**Power value is ß— unit. Value is read power X 100.

5. CONFIRM OPTICAL POWER SETTING PARAMETER

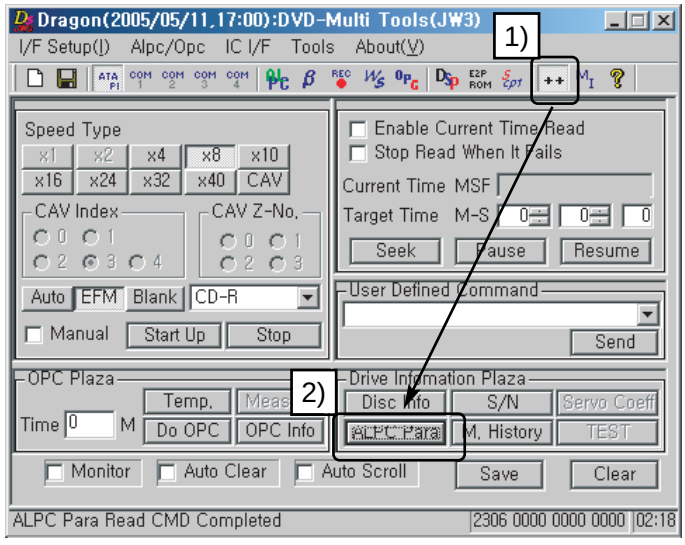
LD Test result is ok, but Loader performance is bad.

1. Check ALPC parameter value

   1) Press [++] button to open 'Results Display' dialog.

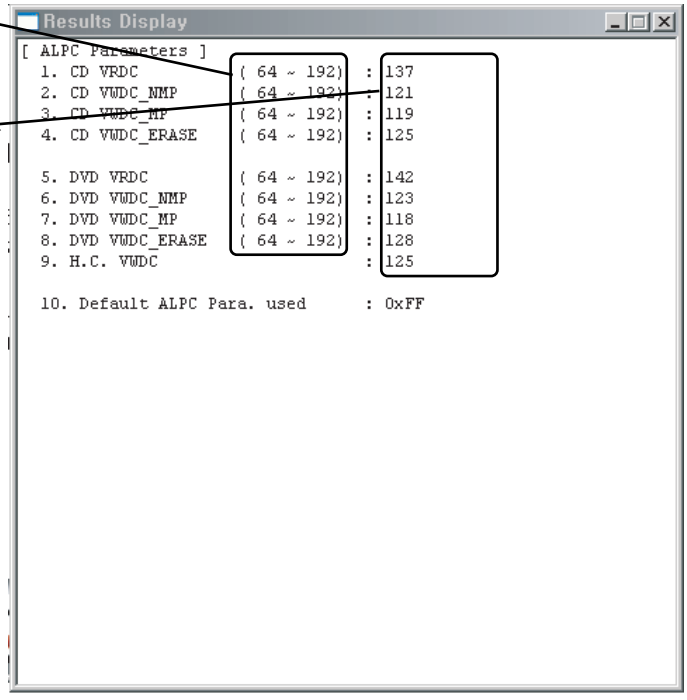
   2) Press [ALPC Para] button.

   - We can see optical power setting value.
   - Write optical Power Setting value to paper.
   - Adjust power setting again.
   - Compare original parameter to new parameter.
   - if parameter value is different highly, original value is wrong or optical power may change.
   - But pick-up LD test is all ok , just adjust optical power setting again.

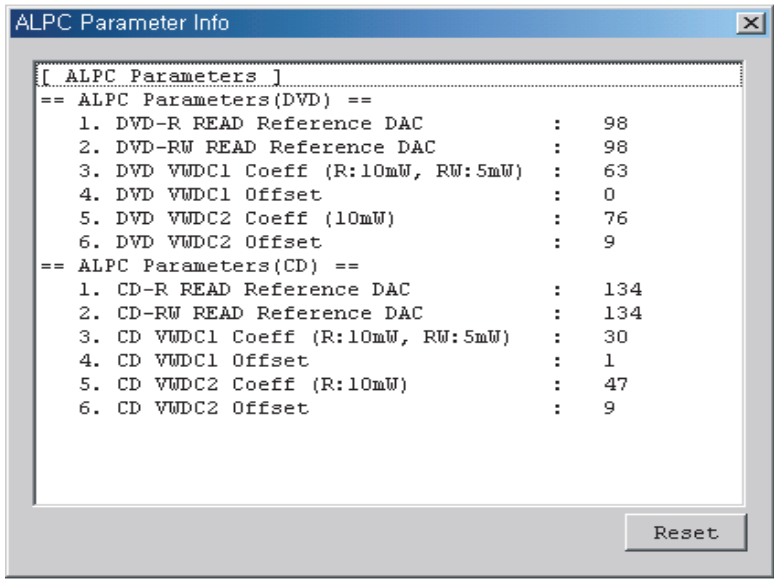


Normal range of ALPC parameter

Optical power value which has been saved in the EEPROM



6. OPTICAL POWER SETTING PARAMETER RANGE



[VALID ALPC Parameters]

< CD >

1) CD-R READ Reference DAC : 30 ~150
2) CD-RW READ Reference DAC : 80 ~ 250
3) VWDC1 : 10 ~ 39
4) VWDC1 Offset : 0 ~ 20
5) VWDC2 : 20 ~ 57
6) VWDC2 Offset : 0 ~ 20

<DVD>

1) DVD-R READ Reference DAC : 40 ~145
2) DVD-RW READ Reference DAC : 40 ~145
3) VWDC1 : 30 ~ 100
4) VWDC1 Offset : 0 ~ 20
5) VWDC2 : 40 ~ 140
6) VWDC2 Offset : 0 ~ 20

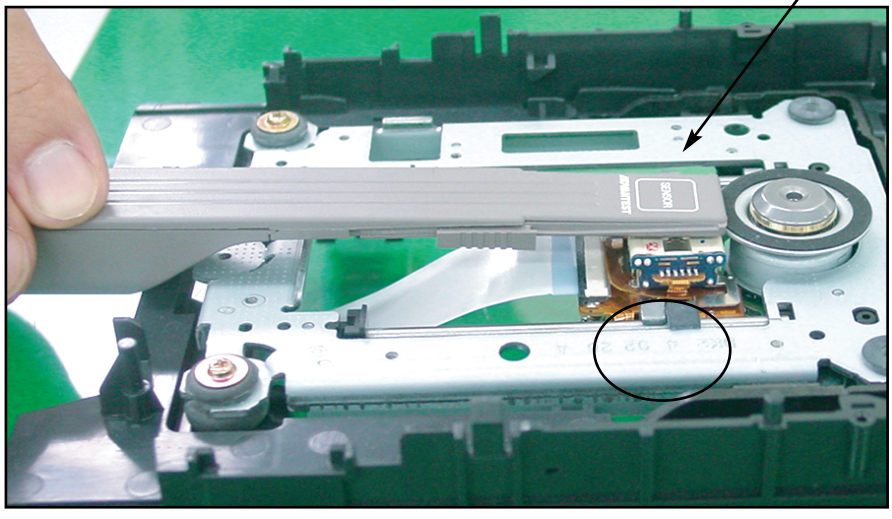
7. ATTACHMENT. OPTICAL POWER MEASUREMENT

Optical Power measurement is to adjust LD power from Pick-up
To measure optical power, LD status is on. Other light affects to optical power.
Avoid other light to measure exact power
Generally headlight power is about 50μW, Sun power is about 100mW.

Optical Power measurement method

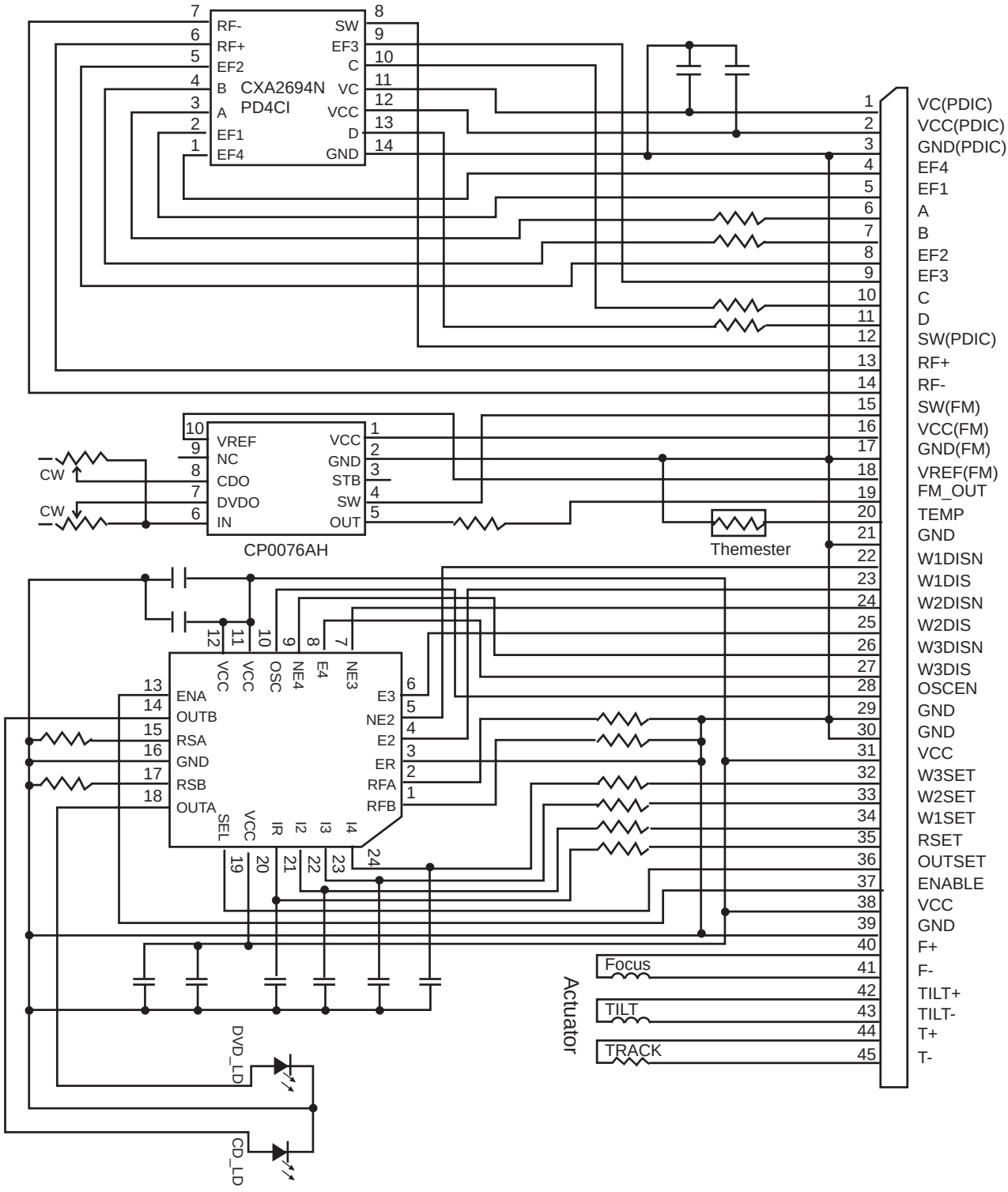
1. Fit optical Power Meter λ(wavelength) value to DVD.(generally 660nm)
2. DVD LD On.
3. Approach power sensor to Pick-up Lens about 3mm vertically. Fix Lens and Sensor ☐ mark position.
4. Read Monitor value. (move sensor read just a little and read max value.)
   (caution) unit is mW.
5. Write monitoring value x 100. Only an integer.
6. Fit opticcal Power Meter λ(wavelength) value to CD.(generally 780nm)
7. CD LD On.
8. 3 ~ 5 recheck.

☐ Display Part



INTERNAL STRUCTURE OF THE PICK-UP

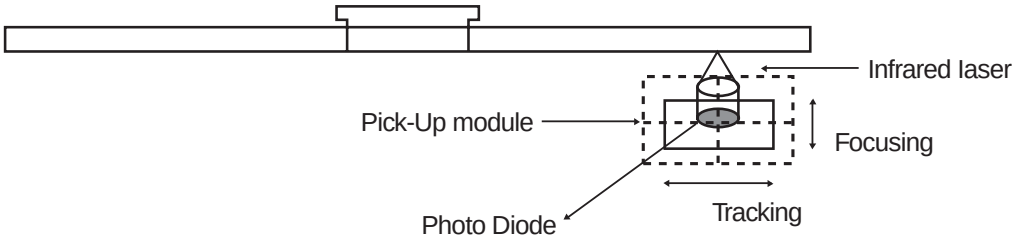
1. BLOCK DIAGRAM OF THE PICK-UP(LPC-812R)



2. PICK UP PIN ASSIGNMENT

No.	Pin Name	Signal Description
45	T-	Tracking Actuator drive signal-
44	T+	Tracking Actuator drive signal+
43	Tilt-	Tilting Actuator drive signal-
42	Tilt+	Tilting Actuator drive signal+
41	F-	Focusing Actuator drive signal-
40	F+	Focusing Actuator drive signal+
39	GND(LDD)	Ground connection for LDD
38	VCC(LDD)	Power supply for LDD
37	ENABLE	Disables output current regardless of OUTEN(ENABLE Low:No lout)
36	OUTSEL	High:selects DVD LD, Low:CD LD
35	RSET	Input voltage for current amplifier
34	W1SET	Input voltage for current amplifier
33	W2SET	Input voltage for current amplifier
32	W3SET	Input voltage for current amplifier
31	VCC(LDD)	Power supply for LDD
30	GND(LDD)	Ground connection for LDD
29	GND(LDD)	Ground connection for LDD
28	OSCEN	TTL control for Oscillator Enable (High Enable)
27	W3DIS	LVDS control for output current (High Enable)
26	W3DISN	LVDS control for output current (Low Enable)
25	W2DIS	LVDS control for output current (High Enable)
24	W2DISN	LVDS control for output current (Low Enable)
23	W1DIS	LVDS control for output current (High Enable)
22	W1DISN	LVDS control for output current (Low Enable)
21	GND(FPD)	Ground connection for PDIC, FPD, TEMP
20	TEMP	Output voltage for controlling temperature
19	FPD-OUT	APC amplifier output
18	VREF(FPD)	APC amplifier reference voltage output
17	GND(TEMP)	Ground connection for PDIC, FPD, TEMP
16	VCC(FPD)	Power supply for FPD
15	SW2(FPD)	FPD output gain Select (High : CD, Low:DVD)
14	RF-	Signal PDIC RF negative differential output
13	RF+	Signal PDIC RF positive differential output
12	SW1(PDIC)	PDIC output gain Select (L/M/H)
11	D	Signal PDIC output D
10	C	Signal PDIC output C
9	EF3	Signal PDIC output EF3
8	EF2	Signal PDIC output EF2
7	B	Signal PDIC output B
6	A	Signal PDIC output A
5	EF1	Signal PDIC output EF1
4	EF4	Signal PDIC output EF4
3	GND(PDIC)	Ground connection for PDIC, FPD, TEMP, LDD
2	VCC(PDIC)	Power supply for PDIC(+5V)
1	VC(PDIC)	Reference voltage input for PDIC)

3. SIGNAL DETECTION OF THE P/U



1) Focus Error Signal ==> (A+C)-(B+D)

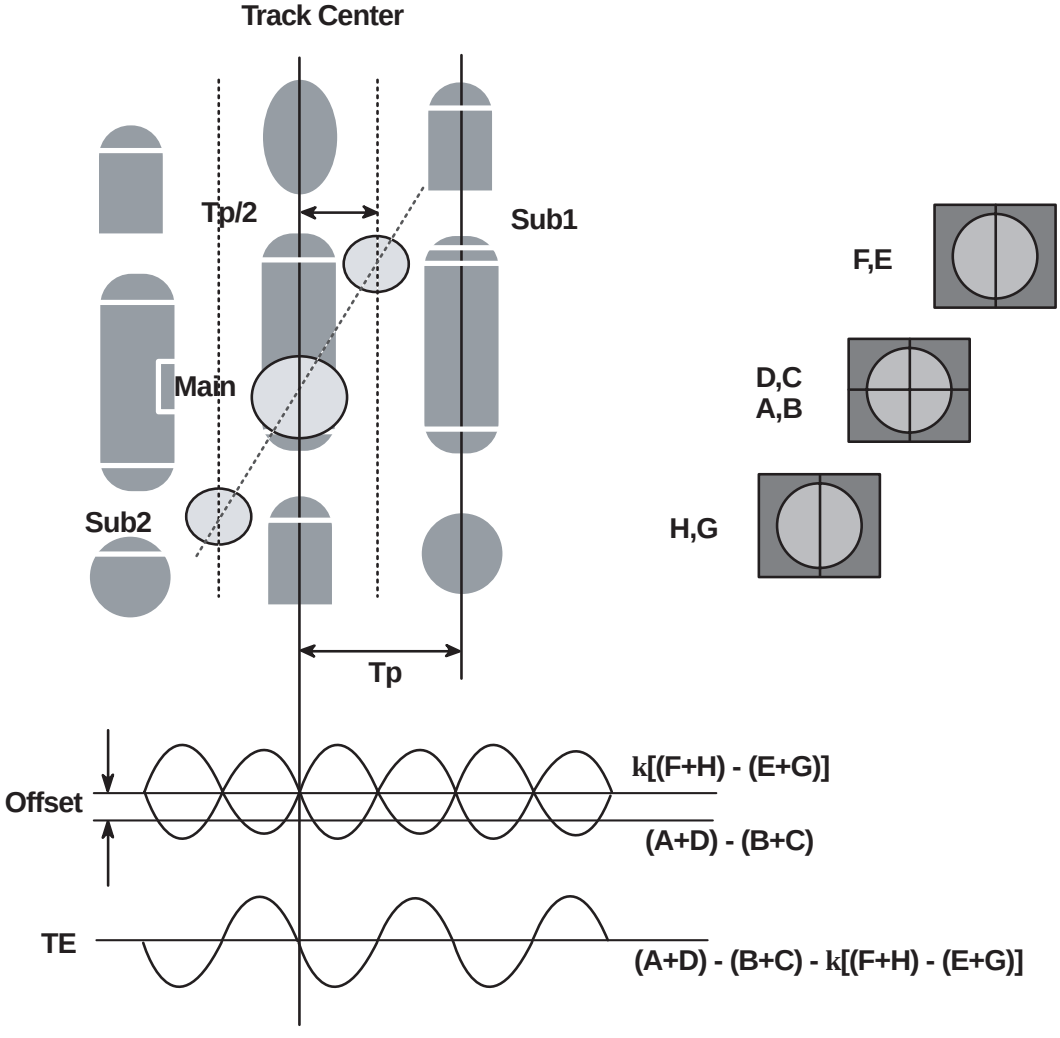
This signal is generated in RF IC (LIC121 : AN22113A) and controls the pick-up's up and down to focus on Disc.

2) Tracking Error Signal (DPP Method) ==> {(A+D)-(B+C)}- *k* x {(EF_1+EF_4)-(EF_2+EF_3)}

This signal is generated in RF IC (LIC121 : AN22113A) and controls the pick-up's left and right shift to find to track on Disc.

3) RF Signal ==> (A+B+C+D)

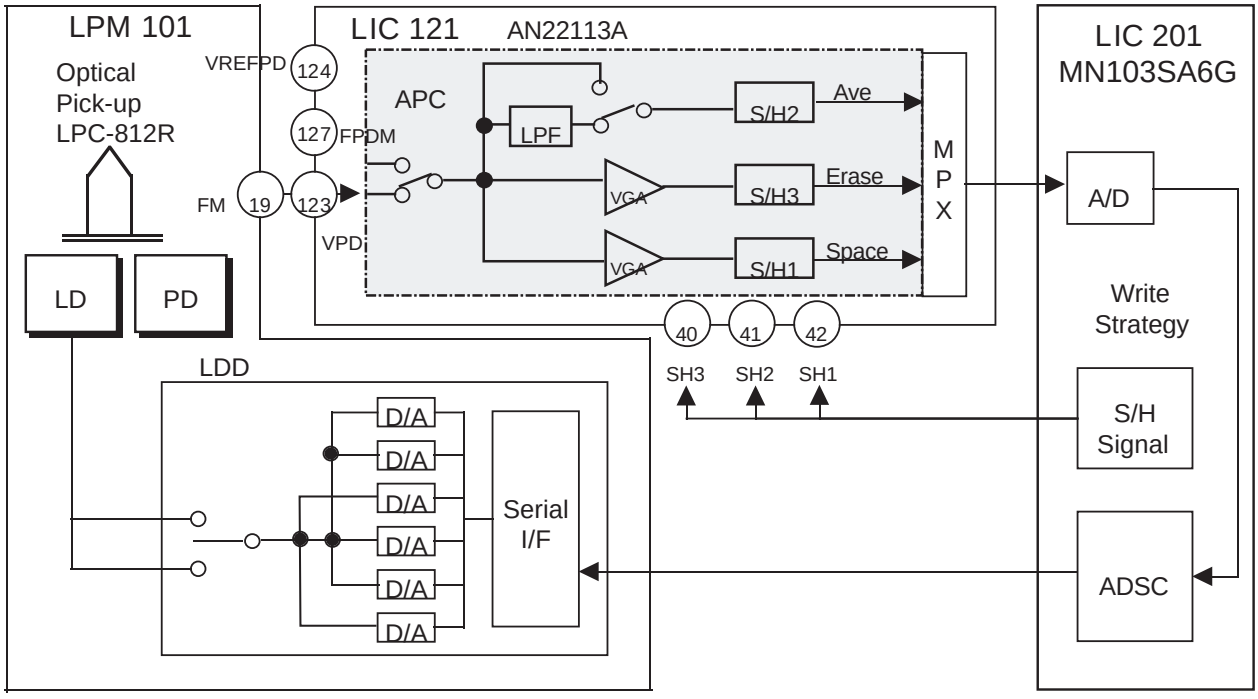
This signal is converted to DATA signal in DSP IC (LIC201 : MN103SA6G).



DESCRIPTION OF CIRCUIT

1. ALPC (AUTOMATIC LASER POWER CONTROL) CIRCUIT

1-1. BLOCK DIAGRAM

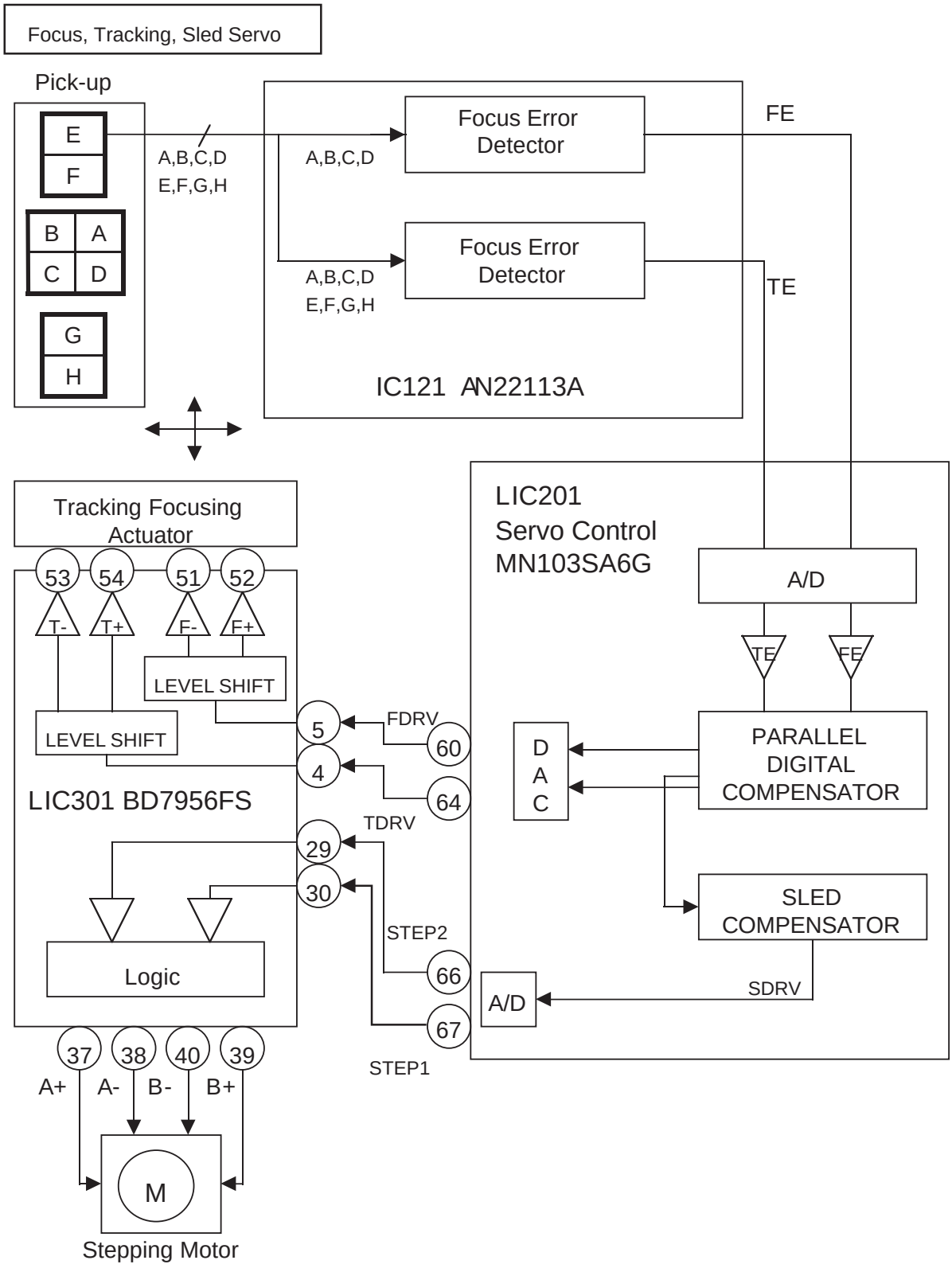


1-2. ALPC (AUTOMATIC LASER POWER CONTROL) CIRCUIT OPERATION

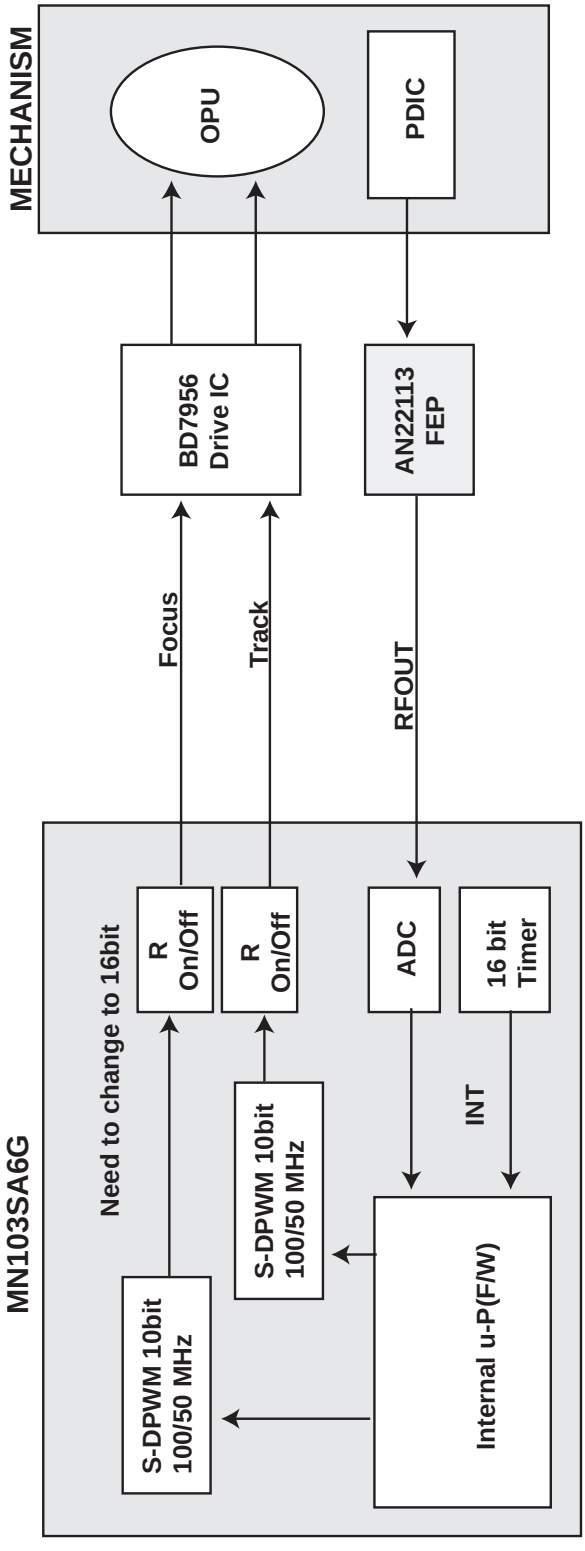
THE ALPC BLOCK DETECTS THE LASER OUTPUT POWER OF THE FRONT MONITOR. THE POWER SIGNAL DETECTED WITH THE PD FOR FRONT MONITOR
DETECTION IS INPUT THE VOLTAGE FROM THE VPD PIN(123PIN) OR THE FPDM PIN(127PIN), THE REFERENCE SIGNAL OF THE INPUT SIGNAL IS
INPUT FROM THE VREFPD PIN(124PIN). THE ALPC BLOCK GENERATES THE SINGALS FROM THE INPUT LASER POWER SIGNALS IN THE
FOLLOWING DETECTION SYSTEMS. THIS BLOCK HAS FOUR DETECTION PATHS:ALL AVERAGE VALUE PATH, MULTI PULSE AVERAGE/PEAK VALUE
DETECTION PATH, ERASE/BOTTOM VALUE DETECTION PATH, SPACE/PLAYBACK POWER VALUE DETECTION PATH.

2. FOCUS/TRACKING/SLED SERVO CIRCUIT

2-1. FOCUS, TRACKING & SLED SERVO PROCESS

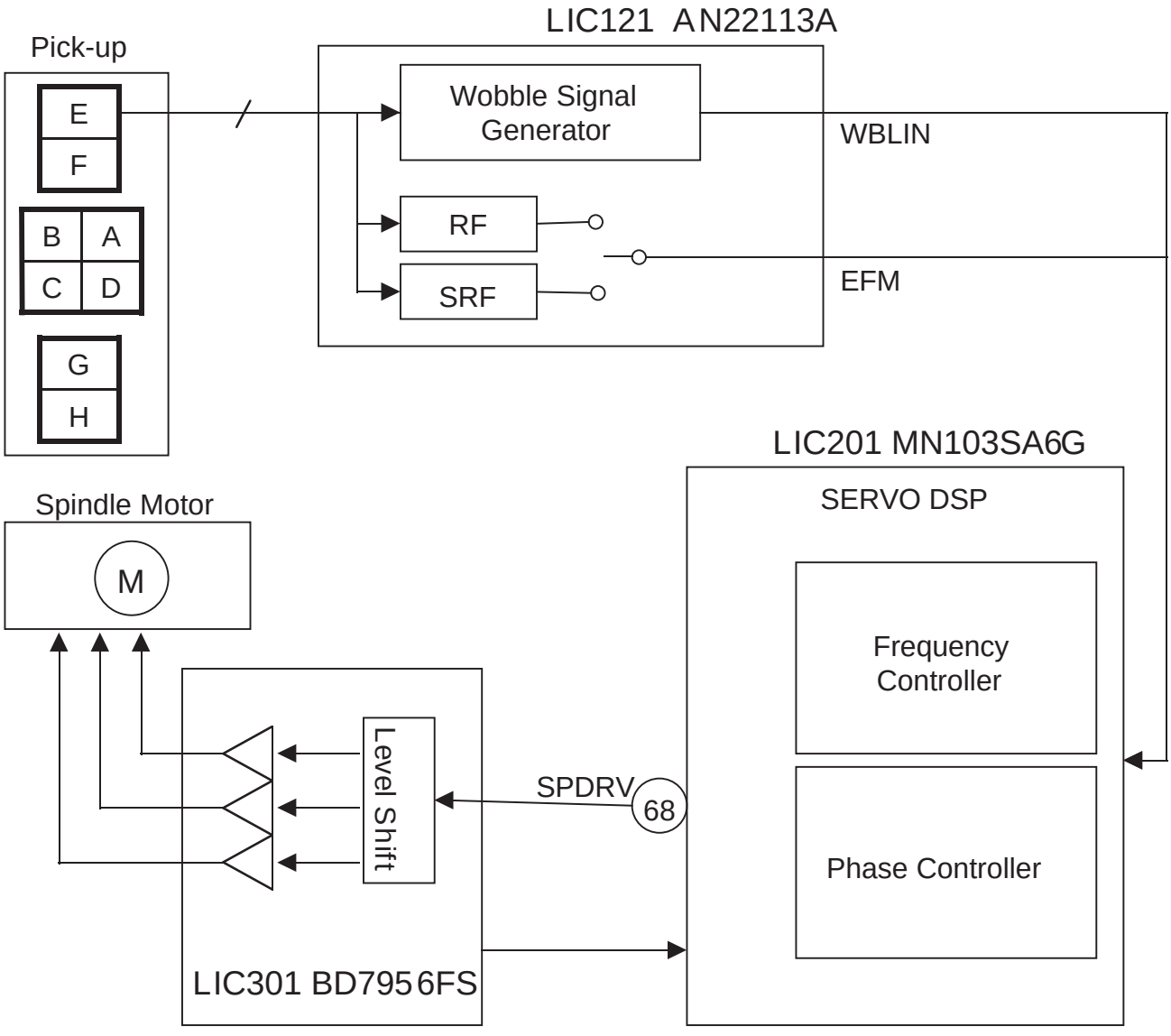


2-1. FOCUS, TRACKING & SLED SERVO PROCESS



3. SPINDLE SERVO CIRCUIT

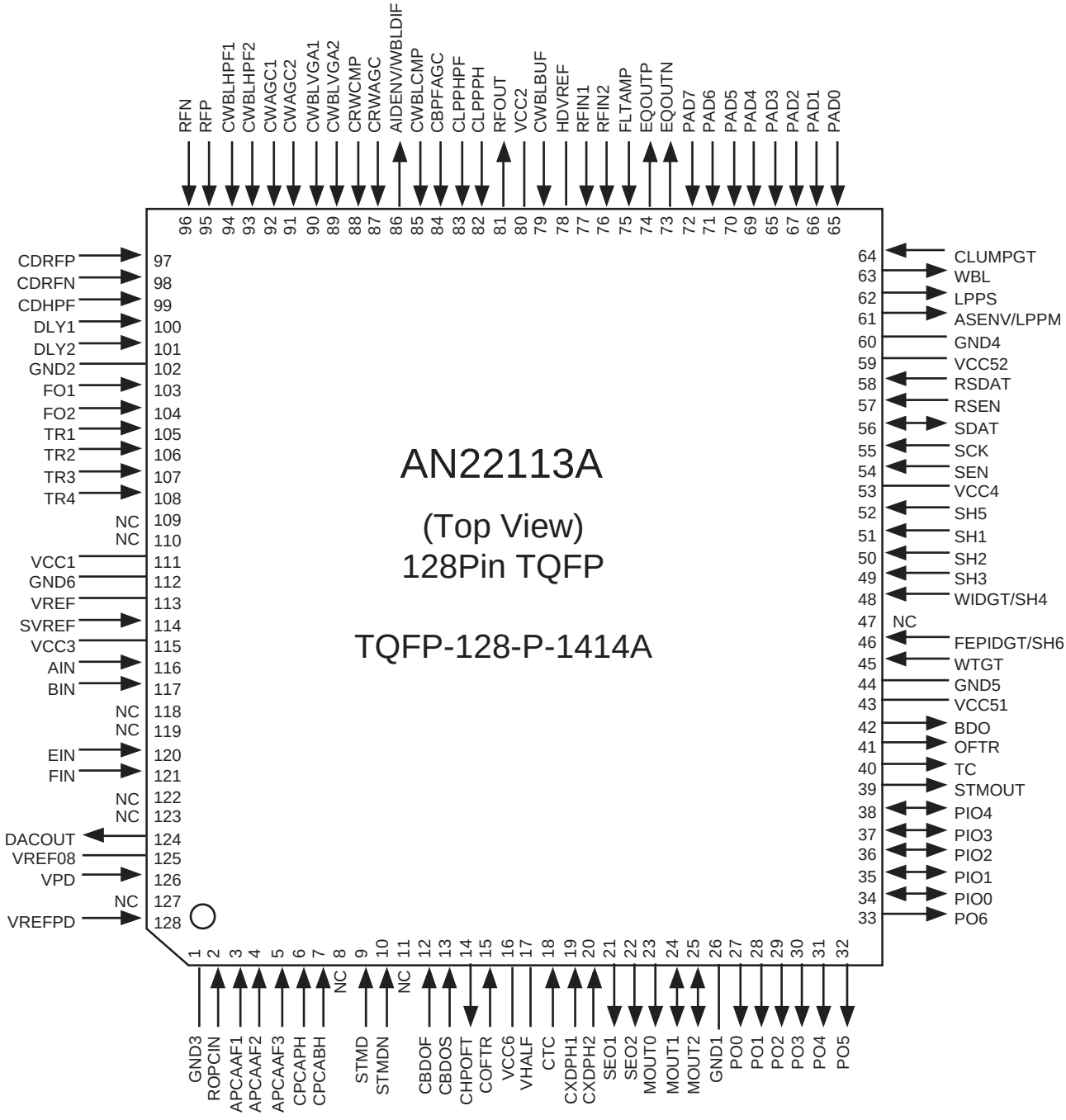
3-1. SPINDLE SERVO PROCESS



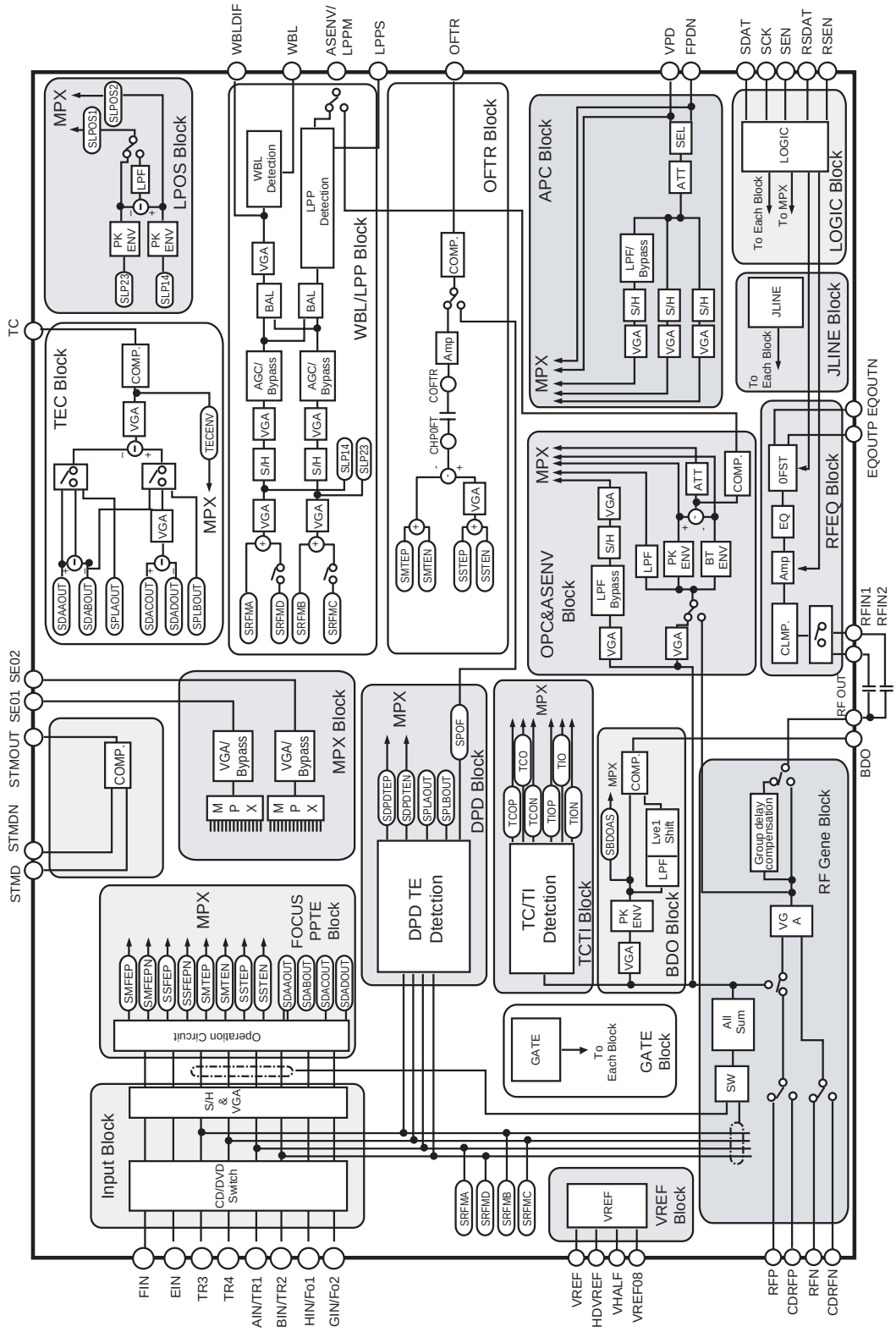
MAJOR IC INTERNAL BLOCK DIAGRAM

LIC121 (AN22113A) : FEP(RF) ANALOG SIGNAL PROCESSOR

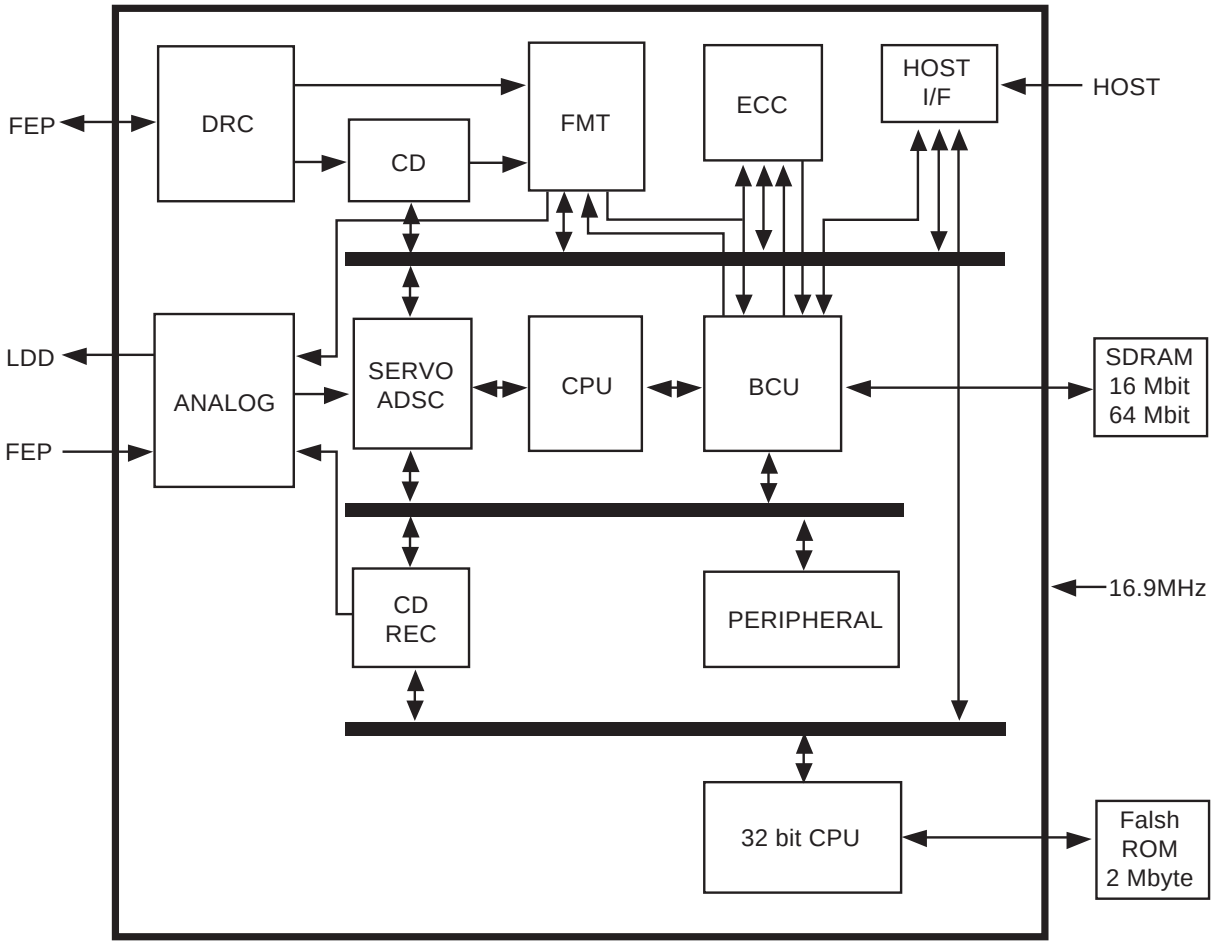
• PIN ASSIGNMENT



• BLOCK DIAGRAM

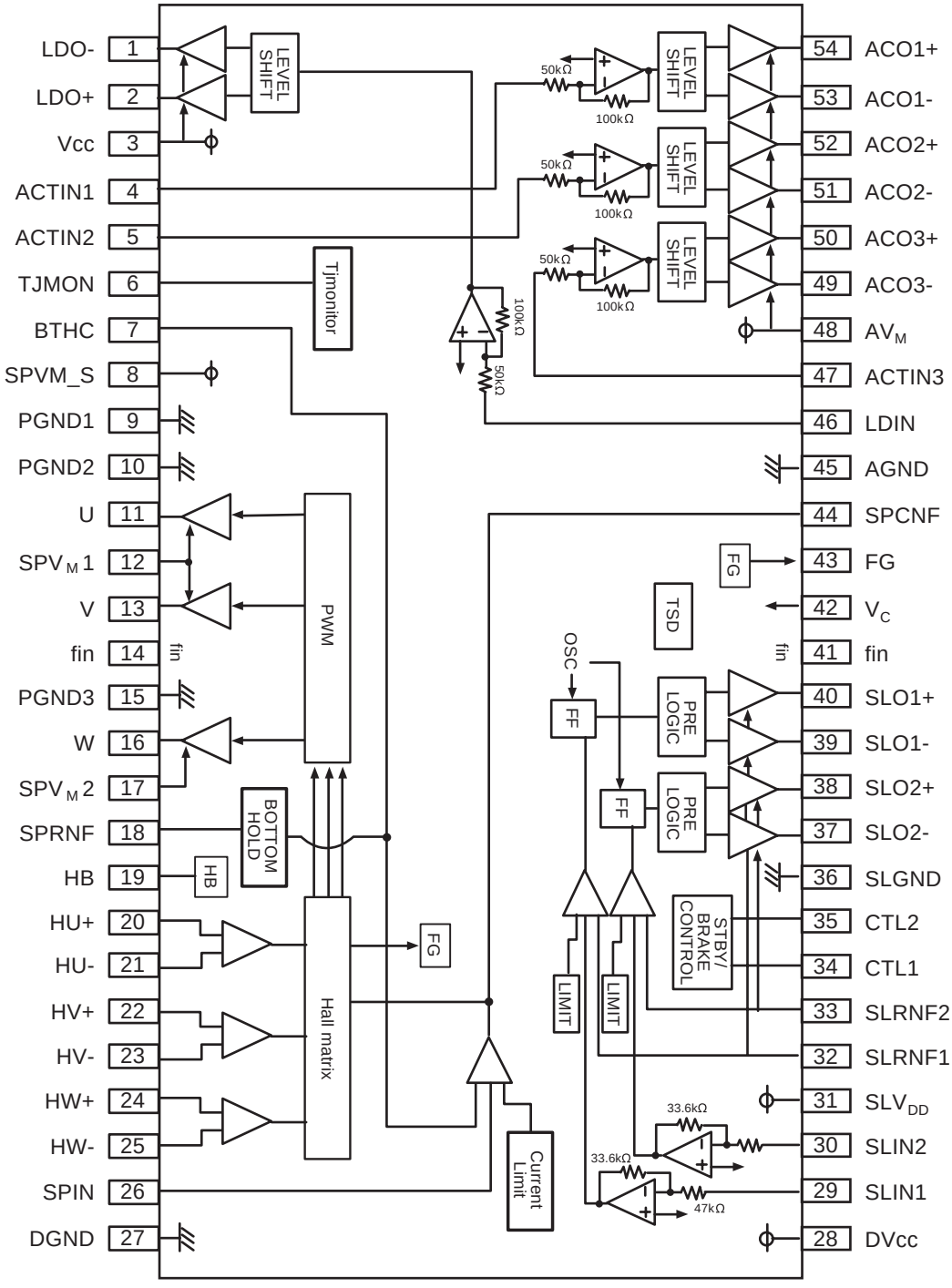


• BLOCK DIAGRAM



IC301 (BD7956FS) : CD-ROM/DVD-ROM 7CH POWER DRIVER

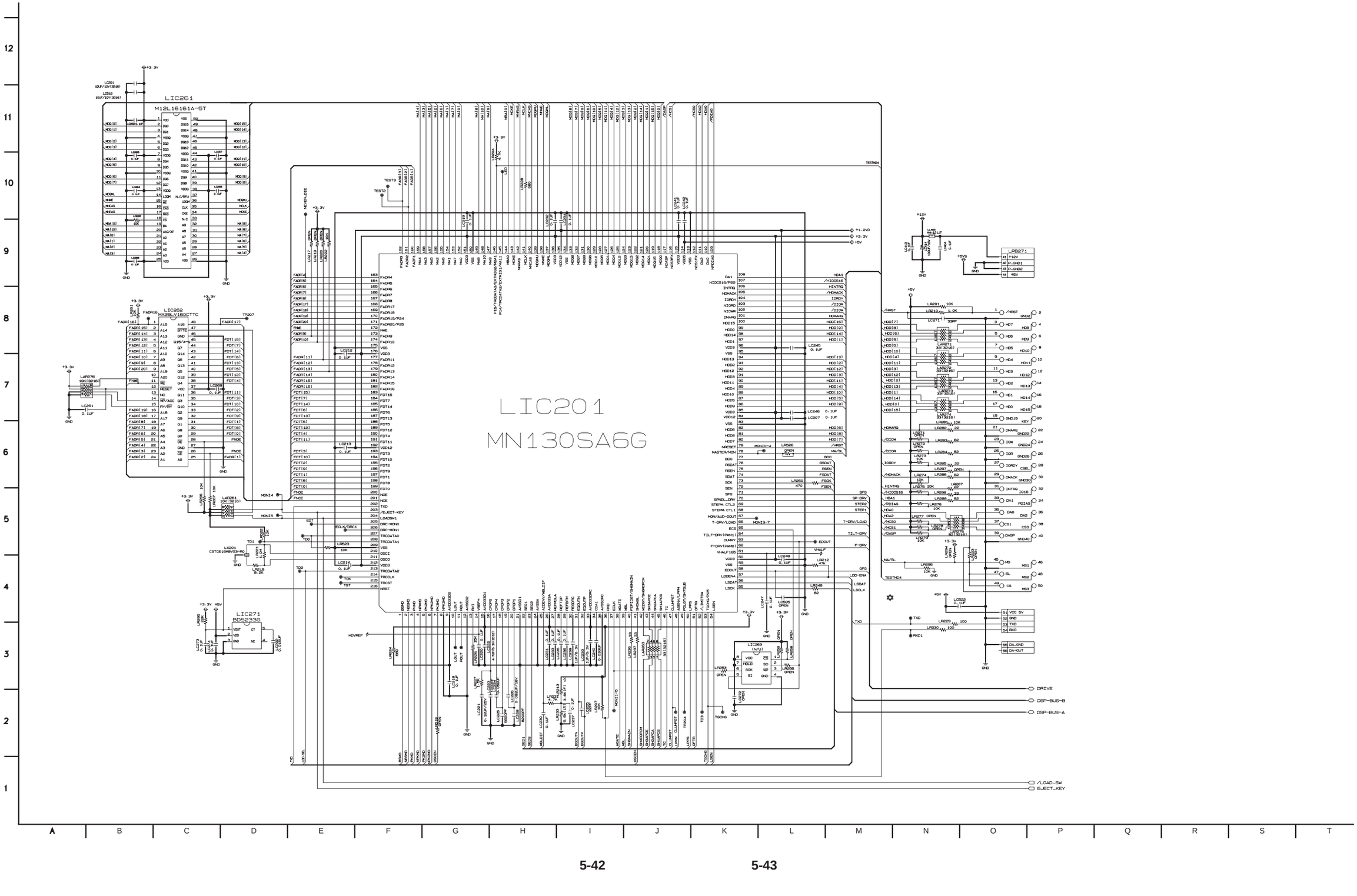
• BLOCK DIAGRAM



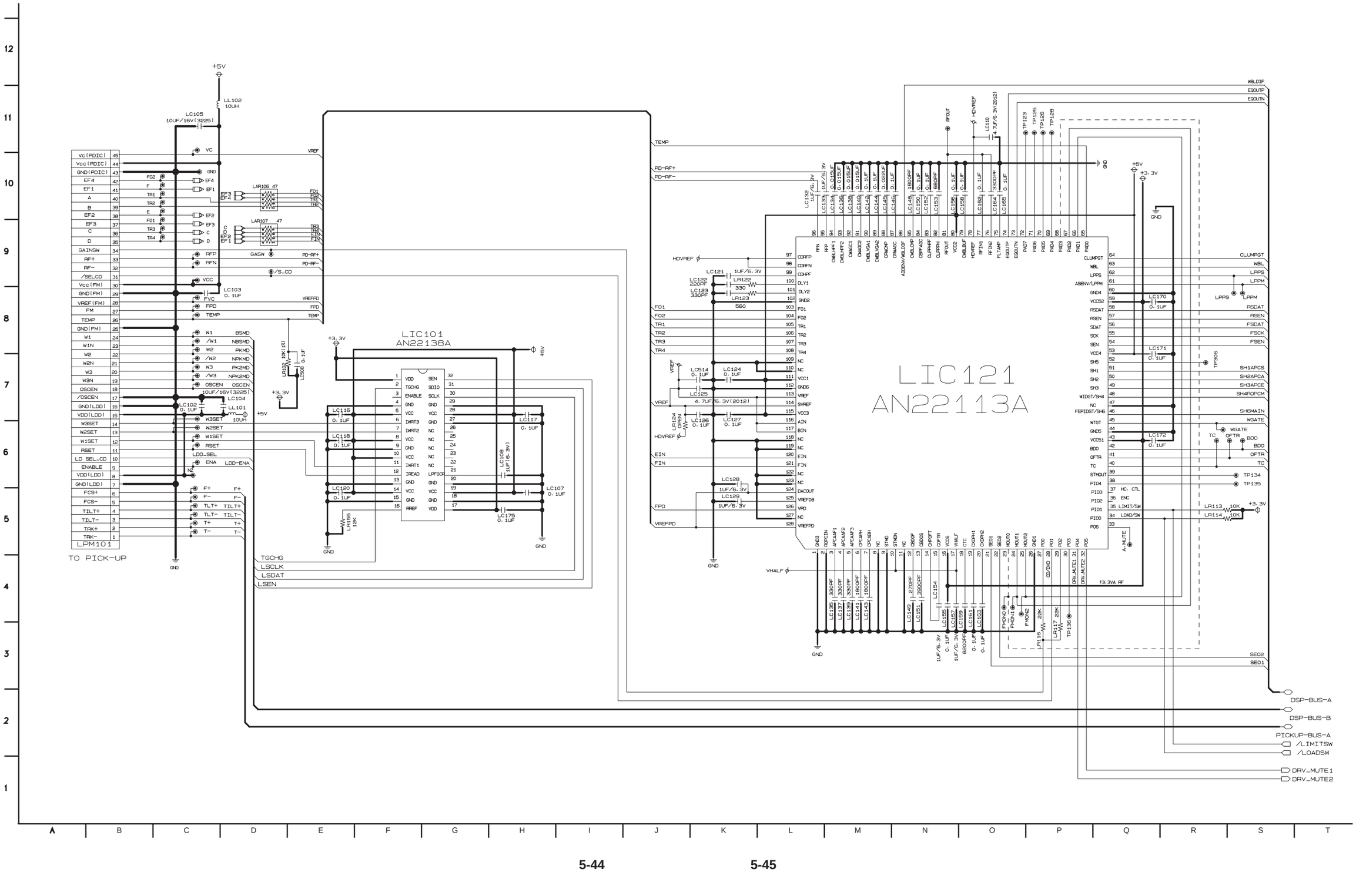
MEMO

CIRCUIT DIAGRAMS

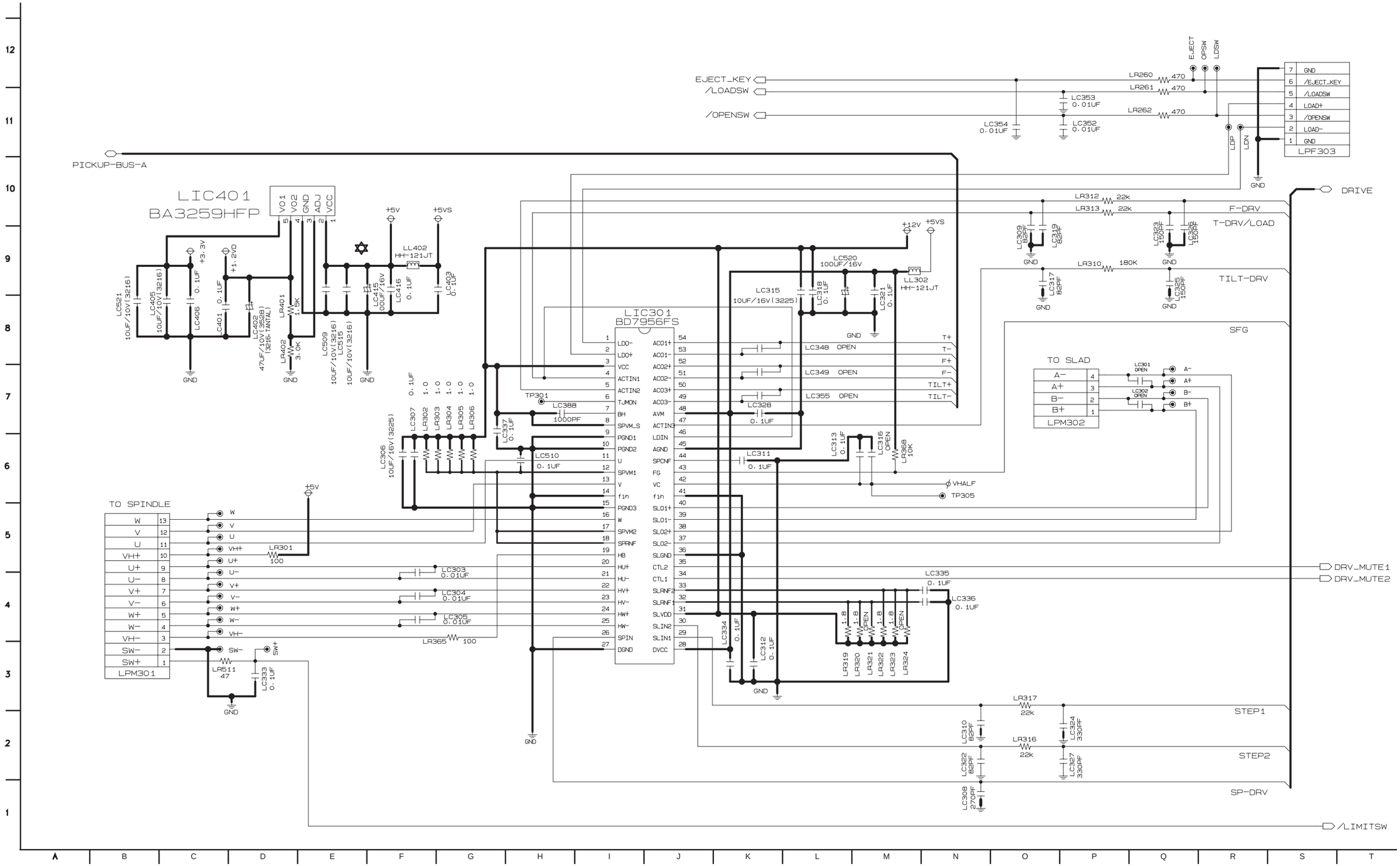
1. DSP CIRCUIT DIAGRAM



2. RF CIRCUIT DIAGRAM



3. DRIVE CIRCUIT DIAGRAM



CIRCUIT VOLTAGE CHART

MODE / PIN NO.	STATE
LIC101	
1	3.29
2	0.00
3	3.28
4	0.00
5	4.99
6	0.00
7	0.00
8	4.98
9	0.00
10	4.99
11	0.00
12	0.00
13	0.00
14	4.99
15	0.00
16	1.09
17	3.28
18	0.00
19	4.99
20	0.00
21	0.00
22	0.00
23	0.00
24	4.97
25	0.00
26	0.00
27	0.00
28	0.00
29	0.00
30	3.29
31	0.36
32	0.00
LIC121	
1	0.00
2	0.00
3	1.69
4	1.64
5	1.66
6	2.67
7	2.60
8	0.00
9	0.00
10	1.65
11	0.00
12	0.25
13	1.58
14	1.82
15	2.20
16	3.29
17	1.65
18	1.56
19	0.00
20	2.50
21	1.42

MODE / PIN NO.	STATE
22	1.57
23	1.33
24	1.10
25	1.33
26	0.00
27	0.00
28	3.30
29	0.00
30	0.00
31	0.00
32	0.00
33	0.00
34	0.00
35	3.20
36	3.29
37	0.00
38	0.00
39	0.00
40	0.00
41	1.61
42	3.29
43	3.30
44	0.00
45	0.00
46	0.00
47	0.00
48	0.00
49	0.00
50	0.00
51	0.00
52	0.00
53	4.96
54	1.23
55	1.65
56	1.62
57	1.65
58	0.61
59	3.29
60	0.00
61	0.00
62	0.00
63	2.95
64	3.29
65	1.21
66	1.34
67	1.16
68	1.34
69	1.35
70	0.50
71	0.70
72	0.00
73	2.03
74	2.03
75	2.14
76	0.30

MODE / PIN NO.	STATE
77	2.19
78	2.19
79	2.16
80	4.98
81	2.18
82	2.96
83	2.14
84	2.79
85	2.21
86	2.49
87	2.85
88	2.20
89	2.16
90	2.19
91	2.19
92	2.19
93	1.68
94	1.67
95	2.37
96	2.37
97	2.19
98	2.19
99	1.62
100	1.49
101	1.44
102	0.00
103	1.65
104	1.65
105	1.65
106	1.65
107	1.65
108	1.65
109	0.00
110	0.00
111	4.96
112	0.00
113	1.65
114	1.65
115	4.96
116	1.65
117	1.65
118	0.00
119	0.00
120	1.65
121	1.66
122	0.00
123	0.00
124	2.51
125	0.81
126	2.50
127	0.00
128	2.50
LIC201	
1	1.65
2	1.19

MODE / PIN NO.	STATE
3	1.64
4	1.18
5	1.65
6	1.19
7	0.14
8	0.00
9	3.30
10	1.65
11	1.65
12	0.00
13	1.50
14	2.19
15	3.30
16	0.27
17	0.27
18	0.23
19	0.00
20	0.25
21	0.00
22	1.43
23	1.57
24	0.00
25	2.01
26	3.29
27	3.28
28	2.24
29	1.73
30	1.29
31	2.02
32	2.03
33	3.28
34	0.85
35	0.00
36	3.28
37	0.00
38	0.00
39	2.95
40	0.00
41	0.00
42	0.00
43	0.00
44	0.00
45	0.00
46	3.29
47	3.29
48	0.00
49	0.00
50	0.00
51	0.00
52	0.70
53	0.00
54	0.00
55	3.29
56	0.56
57	0.00

MODE / PIN NO.	STATE
58	1.17
59	0.00
60	3.27
61	1.65
62	1.65
63	1.06
64	0.00
65	0.20
66	1.65
67	0.00
68	1.69
69	1.52
70	1.65
71	5.00
72	1.23
73	1.63
74	1.60
75	1.50
76	0.61
77	3.28
78	0.00
79	3.26
80	2.80
81	2.14
82	2.67
83	0.00
84	1.17
85	3.27
86	2.82
87	2.20
88	2.40
89	2.70
90	2.20
91	2.70
92	2.20
93	2.20
94	2.20
95	0.00
96	3.28
97	2.20
98	2.18
99	2.18
100	2.17
101	0.00
102	3.27
103	2.15
104	0.00
105	3.27
106	0.00
107	4.96
108	0.00
109	4.96
110	0.00
111	1.66
112	0.00

MODE / PIN NO.	STATE
113	0.00
114	4.96
115	3.28
116	3.25
117	0.00
118	PULSE
119	PULSE
120	PULSE
121	PULSE
122	PULSE
123	PULSE
124	PULSE
125	PULSE
126	PULSE
127	PULSE
128	PULSE
129	PULSE
130	PULSE
131	PULSE
132	PULSE
133	PULSE
134	0.00
135	1.17
136	3.29
137	3.29
138	3.29
139	3.29
140	3.29
141	2.68
142	3.28
143	0.00
144	0.00
145	0.00
146	PULSE
147	PULSE
148	PULSE
149	PULSE
150	0.00
151	3.29
152	PULSE
153	PULSE
154	PULSE
155	PULSE
156	PULSE
157	PULSE
158	PULSE
159	PULSE
160	PULSE
161	PULSE
162	PULSE
163	PULSE
164	PULSE
165	PULSE
166	PULSE
167	PULSE

MODE / PIN NO.	STATE
168	PULSE
169	PULSE
170	PULSE
171	PULSE
172	PULSE
173	PULSE
174	PULSE
175	0.00
176	3.29
177	PULSE
178	PULSE
179	PULSE
180	PULSE
181	PULSE
182	PULSE
183	PULSE
184	PULSE
185	PULSE
186	PULSE
187	PULSE
188	PULSE
189	PULSE
190	PULSE
191	PULSE
192	1.17
193	PULSE
194	PULSE
195	PULSE
196	PULSE
197	PULSE
198	PULSE
199	PULSE
200	PULSE
201	PULSE
202	PULSE
203	3.28
204	0.00
205	3.26
206	3.26
207	0.00
208	0.00
209	0.00
210	OSC
211	OSC
212	3.28
213	0.00
214	0.00
215	0.00
216	3.28
LIC261	
1	3.29
2	PULSE
3	PULSE
4	0.00
5	PULSE

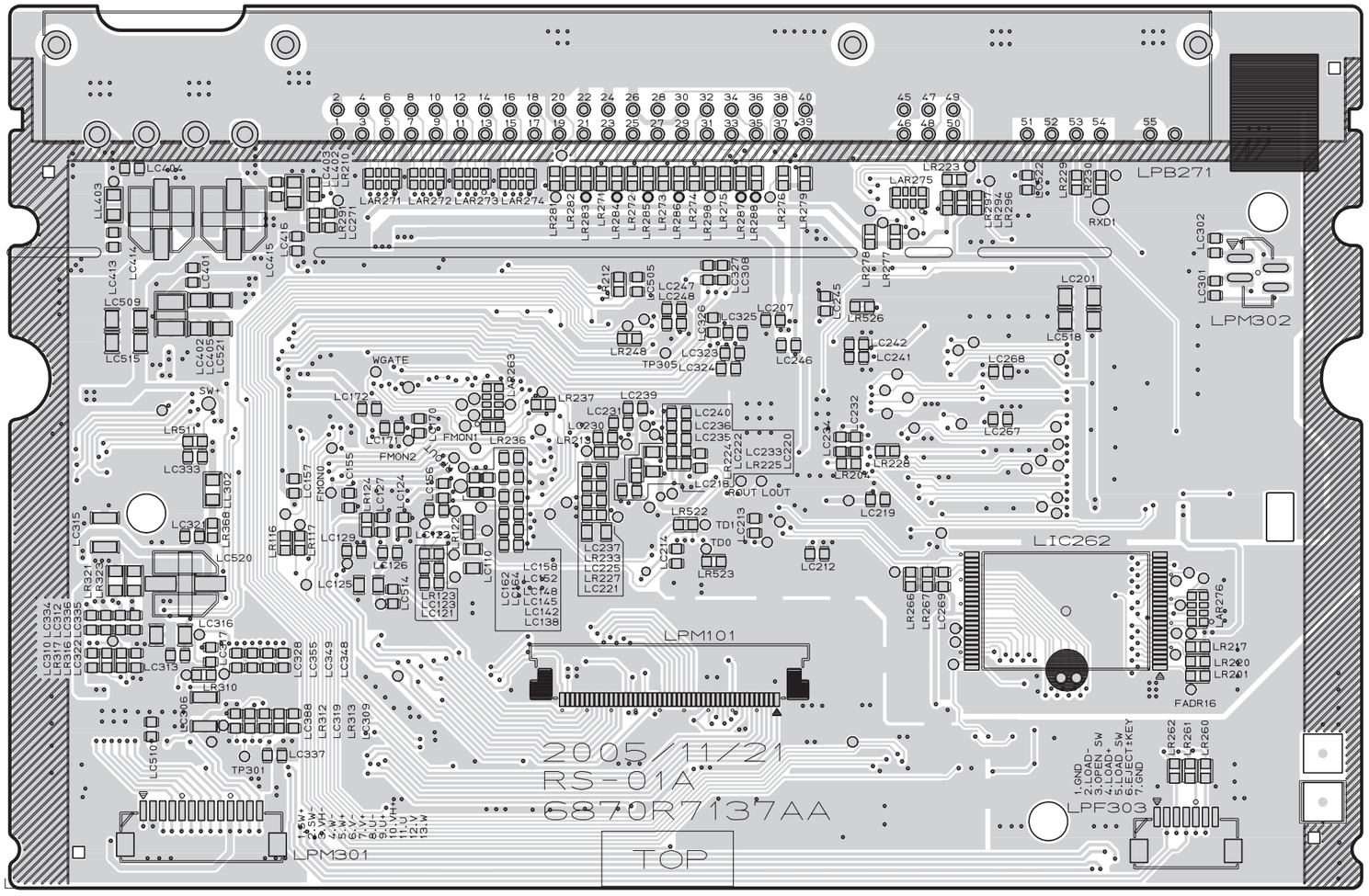
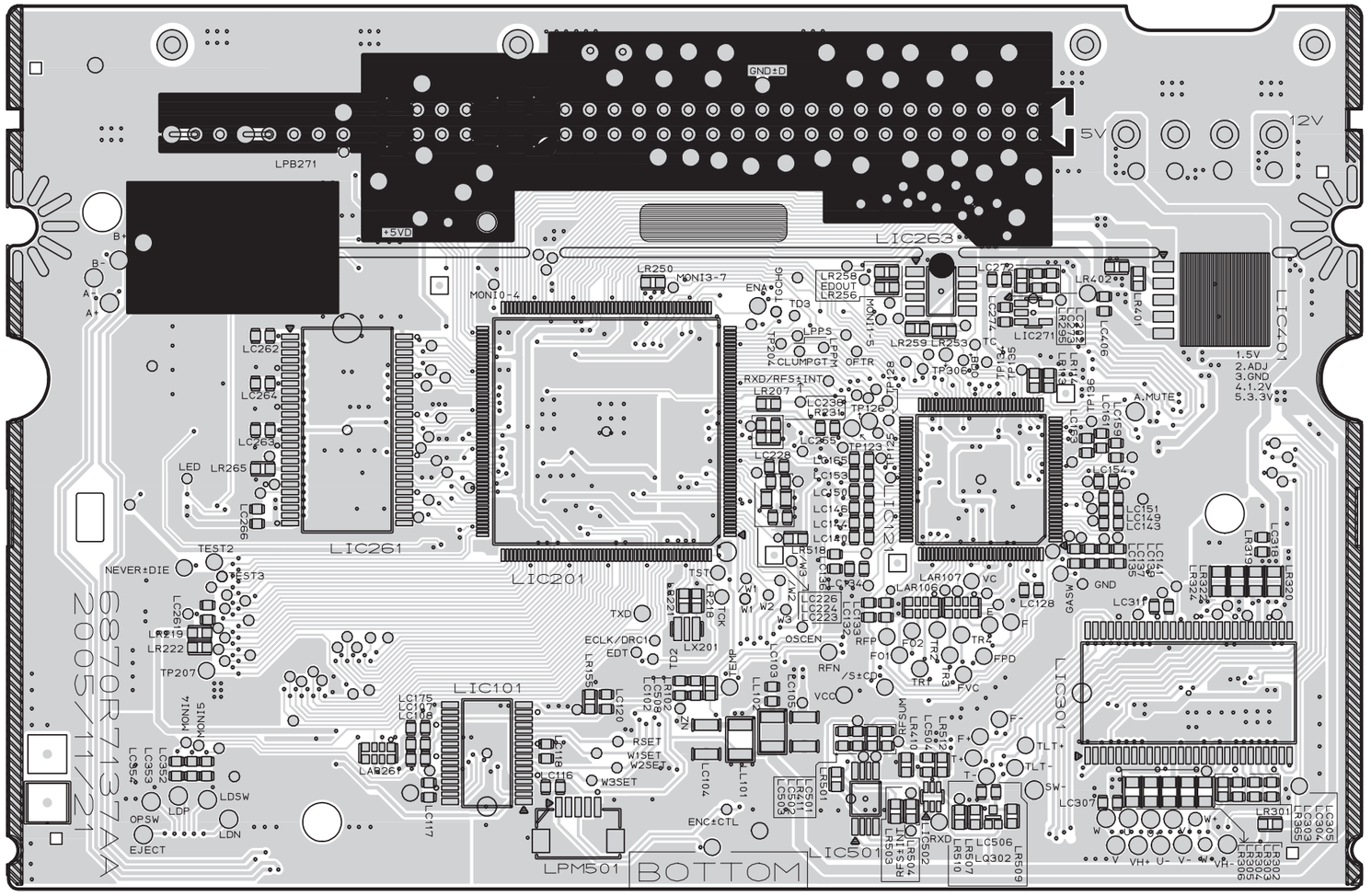
MODE / PIN NO.	STATE
6	PULSE
7	3.29
8	PULSE
9	PULSE
10	0.00
11	PULSE
12	PULSE
13	3.29
14	PULSE
15	PULSE
16	PULSE
17	PULSE
18	0.00
19	PULSE
20	PULSE
21	PULSE
22	PULSE
23	PULSE
24	PULSE
25	3.28
26	0.00
27	PULSE
28	PULSE
29	PULSE
30	PULSE
31	PULSE
32	PULSE
33	PULSE
34	PULSE
35	PULSE
36	PULSE
37	PULSE
38	3.29
39	PULSE
40	PULSE
41	PULSE
42	PULSE
43	PULSE
44	PULSE
45	PULSE
46	PULSE
47	PULSE
48	3.29
49	PULSE
50	PULSE
51	PULSE
52	PULSE
53	PULSE
54	PULSE
LIC262	
1	PULSE
2	PULSE
3	PULSE
4	PULSE
5	PULSE
6	PULSE
7	PULSE
8	PULSE
9	PULSE

MODE / PIN NO.	STATE
10	
11	
12	
13	
14	
15	
16	PULSE
17	PULSE
18	PULSE
19	PULSE
20	PULSE
21	PULSE
22	PULSE
23	PULSE
24	PULSE
25	PULSE
26	PULSE
27	0.00
28	PULSE
29	PULSE
30	PULSE
31	PULSE
32	PULSE
33	PULSE
34	PULSE
35	PULSE
36	PULSE
37	
38	PULSE
39	PULSE
40	PULSE
41	PULSE
42	PULSE
43	PULSE
44	PULSE
45	PULSE
46	0.00
47	
48	PULSE
LIC271	
1	3.28
2	4.99
3	0.00
4	0.00
5	3.00
LIC301	
1	-
2	-
3	12.65
4	1.65
5	1.65
6	0.58
7	11.80
8	12.64
9	0.00

MODE / PIN NO.	STATE
10	0.00
11	-
12	12.65
13	-
14	0.00
15	0.00
16	-
17	12.65
18	12.65
19	4.99
20	4.98
21	4.99
22	4.98
23	4.98
24	4.98
25	4.98
26	1.65
27	0.00
28	5.00
29	1.69
30	1.52
31	12.64
32	12.64
33	12.64
34	0.00
35	0.00
36	0.00
37	0.37
38	1.09
39	1.10
40	1.11
41	0.00
42	1.65
43	4.99
44	0.00
45	0.00
46	1.65
47	1.62
48	4.99
49	0.32
50	0.33
51	0.32
52	0.32
53	0.32
54	0.33
LIC401	
1	4.99
2	0.79
3	0
4	1.17
5	3.29

PRINTED CIRCUIT DIAGRAMS

1. MAIN P.C.BOARD (TOP VIEW)



2. MAIN P.C.BOARD (BOTTOM VIEW)